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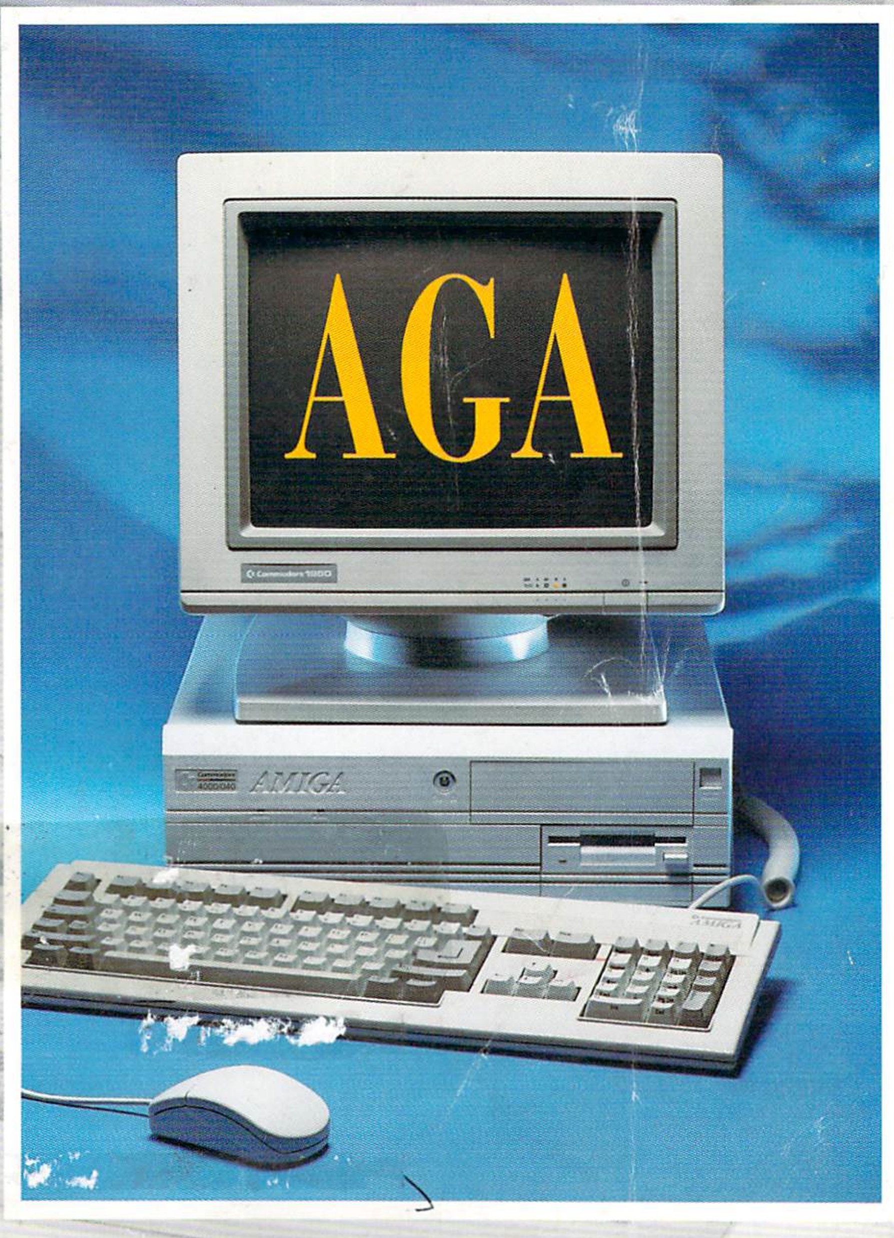
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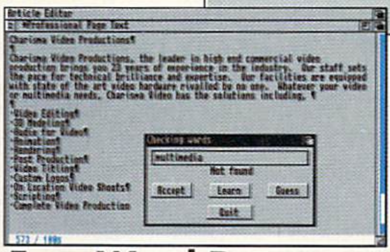
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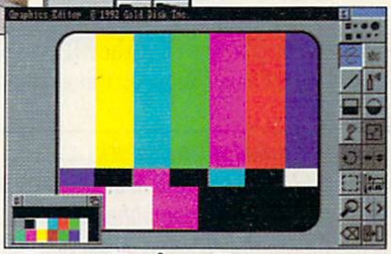


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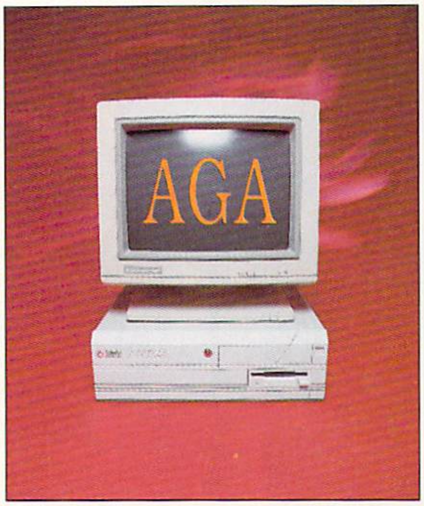
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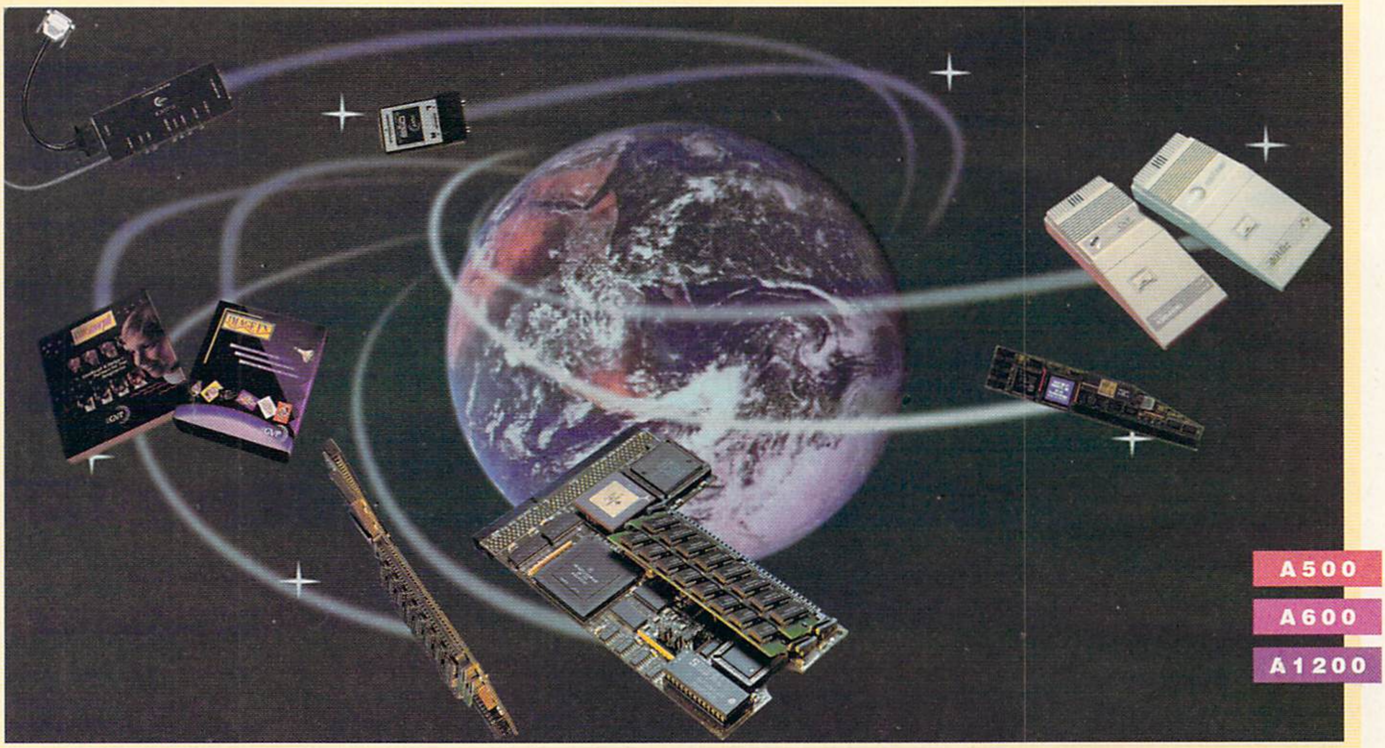
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EDITOR'S DRAWER

*It's an exciting time of change in the Amiga market...but excitement and change can cause confusion. We hope this issue of **AmigaWorld** will ease some of your concerns.*

Hardware Questions

Forgive us Amiga users if we seem preoccupied these days. You see, most of us are grappling with a burning, fundamental question: "Is a new Amiga in my future?"

As Commodore begins shipment of its new AGA line of computers, Amiga users are still busy digesting all the specs and dazzling promises of these new machines. Amiga faithful are carefully weighing the decision whether to upgrade to A4000/1200 machines—representing Commodore's commitment to leading edge technology—or to stick with their present systems, which many users have expanded to include an accelerator and expansion boards, peripherals, and other available add-ons to help them get the most out of their Amigas.

User reaction to Commodore's new machines has generally been favorable. Initial reports—at the World of Amiga in Toronto and overseas sales—indicate that these machines will be a hit.

But grumblings can be heard, specifically from die-hard Amiga 500, 2000, and 3000 owners who are feeling betrayed and pressured into upgrading to one of the new systems. They fear—not without justification—that the Amiga community is being split into two camps. We agree that, at the moment, this market is certainly faced with more questions than answers.

What does all this mean for you? Must you upgrade to avoid the risk of being left behind, or should you stay with your present system? *AmigaWorld* has covered the introduction of the A4000 and the A1200 (in Nov. '92 and Jan. '93, respectively), and, to help you wrestle with the Big Question, we follow up in this issue with a timely exploration of the ramifications of Commodore's recent announcements.

Is the AGA hardware line compatible with existing Amigas? Will A2000/3000 expansion cards work with the A4000? What about video display cards? What existing monitors/peripherals will work with the A4000? What advantage is there for an '040-equipped A3000 owner to upgrade? Which people will benefit most from an upgrade: gamers, productivity users, publishers, artists?

Turn to page 34 to read Commodore veteran Dave Johnson's answers to these and other questions.

Software Concerns

Before you make your first move, however, you'll need to search out the answers to some software questions. What existing software will work with the new machines? Will software developed for the AGA machines work on older machines? How long before we see AGA games?

With the introduction of any new machine, it takes time for user community acceptance and for software development. Amiga users are anxious to know what kinds of new software programmmers will create to take advantage of Commodore's new hardware ...and how long that will take.

In announcing their new machines, Commodore strongly claimed that, "software compatibility with earlier Amiga models has been maintained." That means that while existing Amiga programs will not be able to access the graphics power of the AGA chip set, they will work on the new machines. New software developed for the AGA machines should also work on existing computers.

Users are anxiously waiting to see what new games will support the new graphics modes. Pundits predict that the future holds great promise for games to be showcased on the new Amigas. We'll wait and see.

Most of the software excitement, however, is on the productivity side. We've seen several programs and upgrades—already on the market—that support the graphics modes of the AGA chip set. Commodore is urging manufacturers to develop applications that make full use of the new graphics capabilities. These products will have a definite competitive edge over current products without AGA capability. As you developers test your software for compatibility with AGA and the Release 3 OS, we want to hear the results at *AmigaWorld* so we can pass the information along to our readers.

A New Magazine

If you are interested in the merging technologies of computers and video, you'll want to pick up a copy of *Desktop Video World*, the latest publication from the crew here at TechMedia Publishing. As its name implies, *DTV World* is written for the computer user interested in multimedia presentations and video productions. The first issue, consisting of 128 pages, covers the latest computer/video products, techniques, and information occurring in the PC, Mac, and Amiga markets.

We're pleased with the effort that went into our premiere issue, which features a unique design and boasts some of the top authors in the world of video computing. Be sure to check it out and let us know what you think.

Dennis Brisson
Editor-in-Chief

OVERSCAN

News, New Products and Networks

Such Character!

Lining up 3-D text onto an arc or circle within a LightWave scene requires a steady hand, a calibrated eye, trigonometry, geometry, and, above all, patience. But **Font Flyer** (***MD Grafix***) does away with all those requisites. Simply enter a text string and Font Flyer creates the scene file for you. The package provides ten switches (including circles and arcs on the x and y axes, and three plates) for flexibility. It includes three 3-D fonts, and lets you create your own character sets as well. (RS# 152.)

Kara Computer Graphics offers still and animated 2-D fonts that look three dimensional. **AnimFonts 5** ($59.95) contains KaraGOTHICchisel, a hi-res, shiny, chiseled, light-faced contemporary gothic 104-point ColorFont. In animated mode (which works with programs such as DeluxePaint that support the AnimBrush format), each character "burns" itself onto the screen in a fuse-like, sparkling pen stroke. For more versatility, the two-disk set also includes a static, keyboard font.

Want to use Kara's Toaster Font series on your nonToaster-equipped Amiga? No problem. KaraGOTHICserif, KaraROMANextrude, KaraChiselSCRIPTroman, and KaraBRUSHED, converted to the eight-color hi-res ColorFont standard from Toaster Fonts 3 and 4 sets, comprise the new **Headlines 4** ($79.95). Both releases provide full character sets (upper- and lowercase, numbers, and symbols), installer programs, extra palettes, and utilities. (RS# 155.)



Eurofonts Video helps Toaster users break language barriers.

Classic Concepts can teach your Video Toaster new languages with **Eurofonts Video 3.0** ($129.95). Compatible with both ToasterCG and ToasterPaint, the package provides complete upper- and lowercase alphabets, numerals, and symbols for more than 25 languages (among them are Icelandic, Western European, Scandinavian, Finnish, Baltic, Polish, Hungarian, Albanian, and Romanian) in 14 styles with four sizes each. A Universal Keymap feature streamlines text entry and allows multiple languages on one screen. The 18 accents provided can be placed wherever needed. (RS# 153.)

To support its AGA-compatible Broadcast Titler 2 Super High Res character generator ($499.95), ***InnoVision Technology*** has released **Broadcast Titler 2 Font Pack 2** and **Broadcast Titler 2 Font Enhancer** ($169.95 each). Font Pack 2 offers Avante Garde, Palatine, Dom Casual, Typewriter, Gille Sans, Handel Gothic, Compacta, Exotic, Clarendon, and Lydian in six sizes each, including a 115-scanline version. The Enhancer lets you create more sizes, kern, space, and add antialiasing. (RS# 162.)

Figure Faster

Amiga programmers, why not replace the conventional transcendental function library routines your applications most often use with those in ***Parth Galen's*** **FasTrig**? As an incentive, the company promises its FasTrig functions can execute at 180 times faster than the IEEE Double Precision library subroutines provided with the Amiga system software. At this rate a stock 7 MHz 68000-based Amiga can perform trig operations faster than a 25 MHz 68030 with a 68882 FFP coprocessor! FasTrig itself does not require a floating-point processor, however, or an accelerated clock, although it can be used with such hardware. You need no particular hardware or RAM capacity to use the functions, and all Amiga software versions can employ the routines. (RS# 161.)

Editor-in-Video

With a FutureVideo edit controller and ***Cybercall's*** **CyberEdit** software ($395), you can get started with cuts-only video editing. Capable of controlling two VCRs or camcorders, CyberEdit can handle assemble edits, frame freezes, and audio-only, video, or A/V inserts. After compiling your edit decision list, you can perform the edits one at a time or let CyberEdit automate the process.

A time-code-capable controller is what it takes to make CyberEdit frame accurate. For non-time-code use, an in-line VCR recalibration utility and a tape-slippage tracking function are included. For further automation, the supplied ARexx-compatible VCR driver can be controlled by such programs as CanDo (INOVAtronics), DeluxeVideo III, (Electronic Arts), and The Director (The Right Answers Group). (RS# 150.)

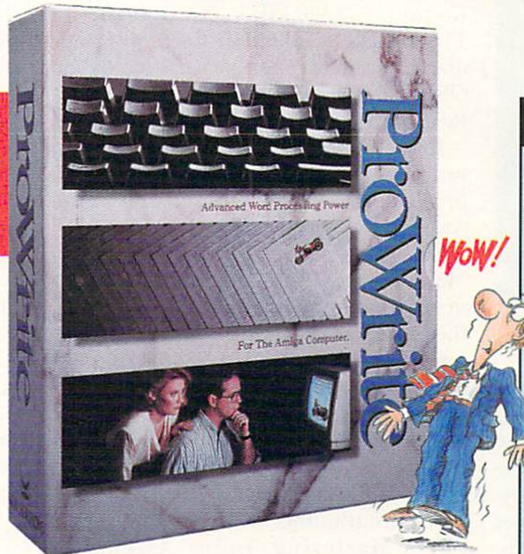
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To locate the vendors of products mentioned, see the "Manufacturers'/Distributors' Addresses" list on p. 118.

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Combine this with ProWrite's already formidable feature set, and you have the most powerful word processor for the Amiga. Features like multiple fonts and pictures. A spelling checker with over 100,000 dictionary words. A thesaurus with over 300,000 cross-references. Outline font support. Jaggie-free printing, for high-quality printing on dot-matrix printers. PostScript printing. Macros and AREXX support for power users. Mail merge, for form letters. And multiple columns, including side-by-side columns for writing audio/video scripts—a ProWrite exclusive! And the list goes on!

And of course, ProWrite 3.3 retains the speed and ease-of-use that has made it famous with thousands of Amiga users world-wide.

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Features

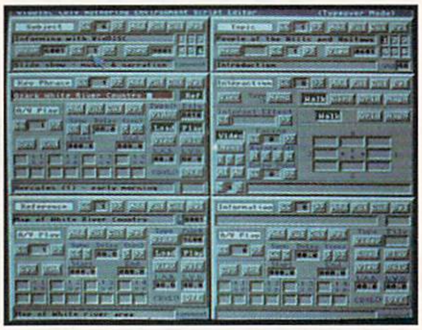
- "What you see is what you get" display.
- Multiple fonts, sizes, styles, and colors.
- Outline font support.
- Insert IFF and HAM pictures in your documents.
  - Automatically wrap text around pictures.
  - Multiple columns, with snaking or side-by-side text flow.
- Spelling checker with 100,000 word dictionary.
- Thesaurus with 300,000 cross-references.
- Full system clipboard support.
- HotLinksTM support.
- Undo and Redo command.
- Mail merge.
- AREXX port.
- Macros, when used with AREXX.
- Name and search for pictures in a document.
- Speaking capability, to read back document contents.
- Separate odd and even page headers and footers.
- Paragraph sorting.
- Automatic page numbering, with five different page number styles.
- Insert current date and time, with five different date formats and two time formats.
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- User-set document comments.
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video, stop-frame video, animation, image dissolves, and color cycling in 64,000-color AVM (Advanced Video Mode) and 4096-color HAM formats. You can specify synchronous or continuous audio to accompany the images, plus enter and edit audio and text in multiple languages. ARexx tools let you process both audio and video in batches, as well as optimize the organization of the application files on your CD-ROM to minimize seek times. VidDISC even generates and index of a disc's contents automatically. (RS# 110.)



VidDISC means CDTV development.

READING LIST

The shelves are bursting with new books. From ***COMPUTE Books*** comes **AmigaDOS Reference Guide, Fourth Edition** ($22.95, ISBN: 0-87455-268-0). This update to Sheldon Leemon's popular tutorial covers new versions of the OS, detailing even the new Release 2 and Release 3 commands. (RS# 112.)

Bruce Smith Books Ltd. also wants to help you improve your AmigaDOS prowess. Recently updated, **Mastering AmigaDOS Volume One** (£21.95, ISBN: 1-873308-10-8) by Bruce Smith and Mark Smiddy offers tutorials on the basics of the commands and scripting, while the team's **Mastering AmigaDOS 2 Volume Two** (ISBN: 1-873308-09-4) is a reference guide to AmigaDOS 2.04. **Mastering Amiga Workbench 2** (£19.95, ISBN: 1-873308-08-6) by Bruce Smith concentrates on working with the Amiga's graphical front-end.

For programmers, Bruce Smith Books offers **Mastering Amiga Assembler** (£24.95, ISBN: 1-873308-11-6) by Paul Overaa, and **Mastering Amiga AMOS** (£19.95, ISBN: 1-873308-12-4) by Phil South. *Mastering Amiga Assembler* covers the fundamentals of assembly language, 68000 instructions and addressing modes, using system header files, working with libraries, low-level Intuition and graphics programming, and advanced topics such as Exec interrupts and mixed-code programming. *Mastering Amiga AMOS* delves into the AMOS language and even points you towards AMOS clubs and program libraries. Companion disks are available free for all Bruce Smith books. (RS# 113.)

For a second opinion on AMOS try Anne and Len Tucker's **AMOS in Action** (£12.95, ***Kuma Computers Ltd.***, ISBN: 07457-0221-X). *AMOS in Action* is full of programming tips, shareware library contacts, and details on AMOS companion products, as well as information on how to get your games published. Send in the book's coupon and you'll receive a free game with source code. (RS# 114.)



ON-LINE SCAN

By Tim Walsh

While the homes and offices of network junkies rarely contain just one type of computer, few users fit each machine with its own modem and phone line. Meaning: The machine used to retrieve files might not be the same one that ultimately uses those files.

For obvious reasons, I'm loath to discuss Macintosh topics in this column, but there's little harm in breaking tradition for important matters. I've witnessed first hand the confusion that typically arises when conversation turns to cross-platform compatibility of archival programs between the Mac and Amiga. Some of the Mac files I've retrieved recently were compressed with archive programs generally assumed to be Amiga or PC-specific.

Using an Amiga is fine for accessing Mac files on the nets, but you need to know what files to get for the destination computer. While it's well known that PkZip was originally an MS-DOS program (PkaZip is the Amiga version), many users are oblivious to the fact that PkZip has gained popularity in recent years on the Mac.

If you want to begin collecting Mac- and Amiga-compatible archival utilities, BIX's Macintosh area holds uz200.cpt, a robust 155K file used to unzip files on the Mac compressed by PKZIP 1.93a or older. It also transforms DOS or Unix text end-of-line markers to Mac format for added compatibility.

Library 15 in CompuServe's MACAP (MACintosh APplications) forum is where you'll locate the 47K Mac-executable file, UNZIP.BIN. You'll need either a Mac or ReadySoft's A-Max II device on your Amiga for the program to unzip Mac files compressed with PkZip on the PC or PkaZip on the Amiga.

While cruising for Mac-compatible Amiga files in the CompuServe 'hood, drop in on the AmigaUser forum where you'll see UNSTF2.LZH, version 2.0 of Peter Heinrich's Unstuff. Mac files that are compressed with the StuffIt utility (indicated by a .SIT file extension) can be decompressed on your Amiga using this utility. That's a handy, time-saving feature if you want to read documentation. It even includes the WhackMac utility to convert Mac sound samples and a Crlf program to convert text.

GEnie's Mac RoundTable provides file number 20205, which resides under the name MACLHARC0.41.SIT. A 22K Mac utility that can be used to decompress Amiga and PC LHarc archives, this is a truly useful utility for anyone who wants to view the contents of compressed Amiga files on a Mac without first converting them. The documentation that accompanies this file cannot be displayed with most Mac text readers, but, like most Mac programs, it can be mastered without any required reading.

Finally, there's a file on Portal that can make life more compatible between the two platforms. The Disk Utilities area under the Macintosh SIG is where you'll find UnZip.sit—a StuffIt file that performs the same unzip functions on PC- and Amiga-zipped files as CompuServe's UNZIP.BIN.

While these are hardly all that's available for moving files between the Mac and Amiga, they are some of the more significant. Next month: A look at cross-platform archivers for the PC and Amiga.

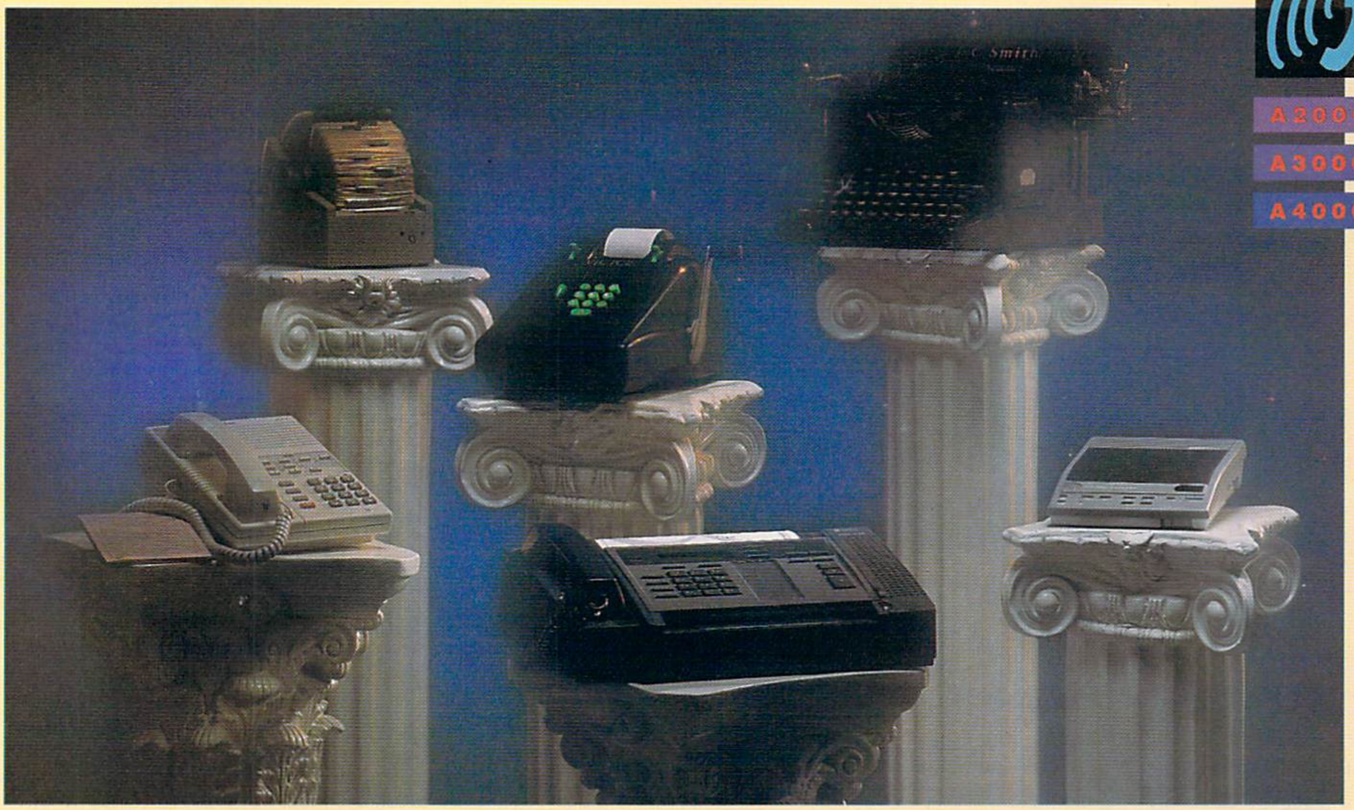
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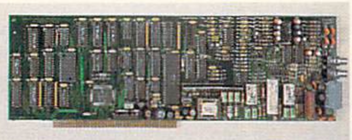
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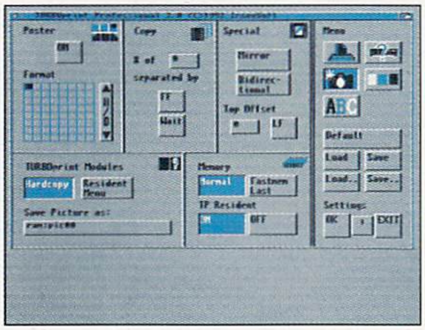
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Prints Charming

Does your dot-matrix printer deliver mysterious dot patterns, different colors than you see on screen, and other unwanted results? Maybe it's not a hardware but a software problem. Maybe you should try **TURBOprint 2.0** ($129.95, ***INOVAtronics***). A multifeatured printer driver, the software promises to output text and graphics to the highest possible resolution of your hardware. And because it supports most current color and black-and-white models, it's likely got you covered.



TURBOprint promises to really clean up your act.

To improve text printing, the program includes a half-line mode to reduce horizontal banding and two levels of smoothing algorithms to eliminate stairstep edges. Image output should benefit from 14 kinds of rotatable print dithering, the ability to posterize, and the wall-size print feature. You get direct control over color correction and brightness for color prints, and the ability to generate separations as well. You can even produce reverse images for T-shirt transfer and so on. (RS# 154.)



Overheard

Through March 31, Commodore is offering savings on its new A4000 and A1200 machines through the Power Up program. Through this offer, you can purchase an Amiga 4000, along with ASDG's Art Department Pro image processor and Electronic Arts' DeluxePaint IV AGA paint software, for just $2693—a $1500 savings. For just $599 (a $600 savings), the A1200 comes with DPaint and SoftWood's Final Copy 1.3 word processor. (For details on the hardware, see p. 40.) To take advantage, see an authorized dealer; Commodore will send applications software to purchasers directly.

Also, Commodore is now shipping AmigaDOS 2.1, an updated version of the Amiga's operating system previously available only on the Amiga 600 computer. If you now own AmigaDOS 2, you need only a $49 upgrade kit that includes six disks and a set of manuals. Upgrading from versions 1.3 or earlier requires the $99 kit, containing 2.1 ROM chips in addition to the manual and disks. You can acquire either upgrade through authorized Commodore resellers. While the latter upgrade must be installed by an Authorized Commodore Service Center if you wish to maintain the warranty on your computer, the former you can order through CommodoreExpress at 800/448-9987.

Media in the Making

In working to upgrade its image-processor Butcher, ***Eagle Tree Software*** set its sights on a further shore. What resulted is **Helm**, a multimedia authoring package with an accent on image handling. Numerous bitmap and object-oriented drawing tools are integrated into a single interface so you need not switch to another program to create or modify images. In Helm, you create objects directly on the pages of electronic books, attaching actions or scripts to the objects (by clicking and dragging) to trigger music, animations, and so on, or to jump to another page or book. And you can test your work as you go. Your resulting application or interactive presentation is actually a database: The pages are records that can contain the various elements. Helm retails for $189, but registered Butcher owners can upgrade to the Helm package for just $79. (RS# 156.)

According to ***Activa Software***, multimedia should be practical, able to work with inexpensive equipment, and should deliver solutions, not problems. The company promises its new **MediaLink** fits the bill. The ARexx-capable software supports most video/display cards, laserdisc players, VCRs, and SunRize's Studio 16 sound card. Time-based applications may enjoy MediaLink's support for three time-code systems: MIDI, SMPTE/EBU, and standard timing to 1/10 of a second. And video editors can benefit from the large, antialiased fonts, line-by-line and page transitions, real-time loading from hard disk of larger-than-memory animations and sounds, and the time-base counter. For audio/video synchronization, timing is measured relative to the start of the script, not the previous event. A feature called XaPP allows for modular customizations, while a remote-access option lets you transfer scripts and data via cable, network, modem or satellite. (RS# 157.)

Both Helm and MediaLink are compatible with AmigaDOS 1.3 and up.

Musical Notes

Whether you want to learn to read and write music, develop a keyboard-playing style, or need a selection of MIDI sequences for video and multimedia use, two developers have you covered.

Electric Theatre's **Keys To Music** is a later incarnation of the software that won Commodore's 1991 AmigaVision contest. Five volumes are planned; two are available now at $59.95 each (demo disks are $2). **Volume I: Learn To Read Music** can complement musical-instrument instruction with its coverage of musical terms, names of notes, accidentals, note values, and basic rhythm. **Volume II: Learn To Write Music** explores time signatures, key signatures, and scales, and composition. Both releases employ synthesized voice, graphics, text, and musical examples, and provide games, drills, and quizzes to promote learning. The software is suitable for both adults and school-age kids. (RS# 158.)

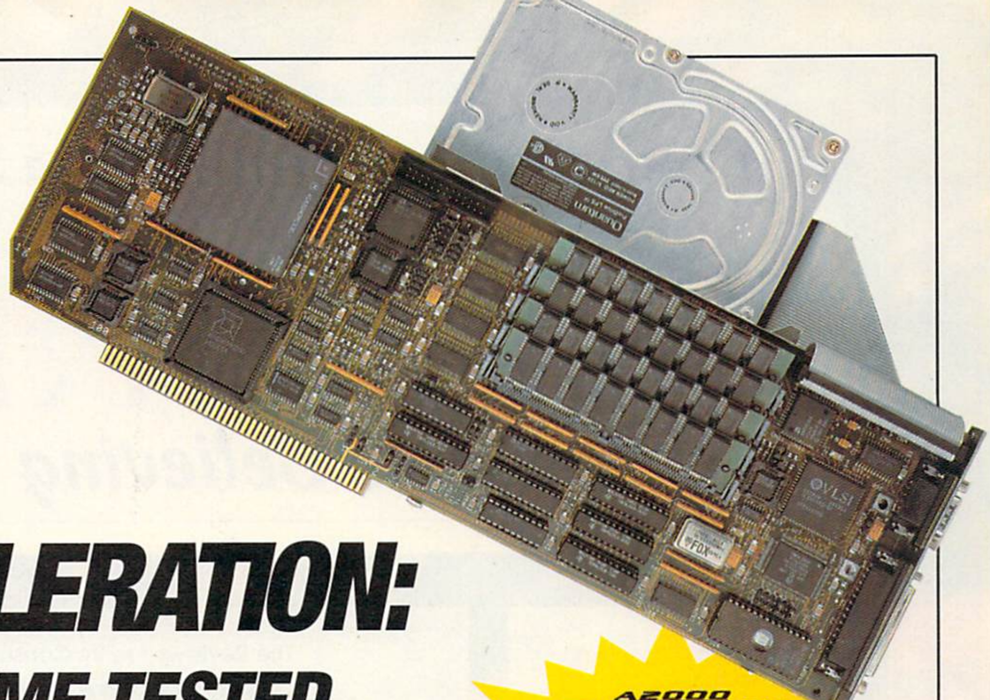
New Sound Music's **Rock Through MIDI** ($39.95) presents analysis of over 65 classic rock keyboard riffs, including those of Elton John, Stevie Wonder, Little Richard, Billy Joel, and others. You can use these to learn the masters' techniques and develop your own style. Each sequence uses drums, piano, and bass; note-for-note transcriptions are included. For those more interested in listening than playing, there's **Soundtracks For MIDI** ($49.95), a collection of fully orchestrated, multitrack sequences in several styles, including action/drama, jingles, industrial and corporate, cartoons, horror, suspense, and more. The sequences were designed for easy incorporation into your video and multimedia productions. Both programs require a MIDI keyboard and a sequencer. (RS# 159.)

How's That Graph You?

Need to produce publication-quality graphs for illustrating scientific and technical documents? Perhaps you need **AMPlot2**, from the British company ***SciTech Software***. The software (£60, £3 for a demo disk) allows four major graph types—line and scatter plots; bar and pie charts—with many variations. The program will automatically calculate graph boundaries, ticks and subticks, although you can override this feature. And error bars, log axes, and three types of curve fitting are provided for scientific applications. Via the Intuition interface, you can supply input in any form from two columns of numbers to commands that

Continued on p. 16.

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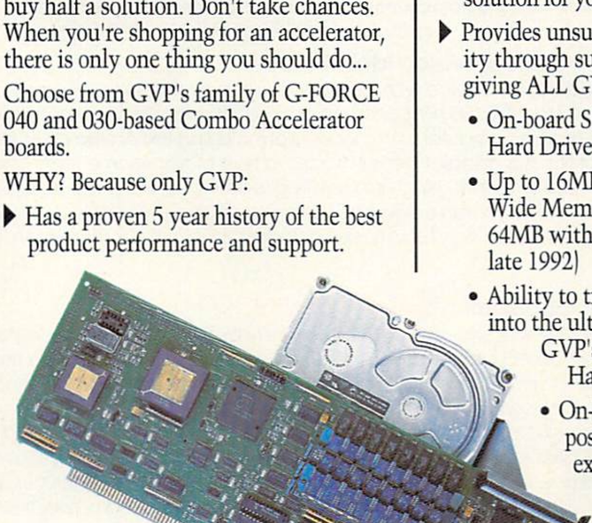
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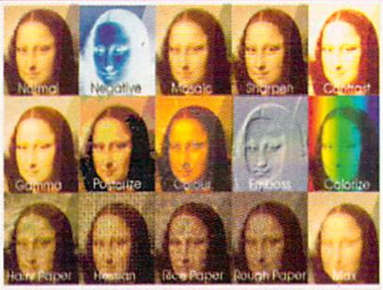
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OpalPaint's new Chrominance Effects allows absolute, real-time control of image contrast, brilliance and re- mapping of colors.



OpalPaint's image processing modes will alter any area or an entire image. More than a paint program, OpalPaint is a complete creative environment.



OPALPAINT's exclusive real-world Artist's Tools and paper types bring a new level of artistic creativity to the Amiga.

The Reviews Are In. Consumers and Experts Agree: OpalVision Sets A New Standard of Excellence.

"OpalPaint is the overall champion of Amiga paint programs"
—Desktop Video World, USA

"One of the hottest new Amiga display boards. OpalPaint includes state-of-the-art features not found on any other Amiga paint program."
—Amiga World, USA

"Quite simply, it's a spectacular product."
—Amiga Computing Magazine, UK

"Undoubtedly the finest, most professional paint program to arrive on the Amiga."
—Amiga Format Magazine,UK

"OpalVision is awesome!"
—Camcorder Magazine,USA

"A Very Powerful Product, much better than GVP's IV—24"
—Fortis Aldo, Switzerland

"Professional quality at this price can't be turned away."
—Amiga User International Magazine,UK

"OpalVision is an amazing delight."
—Hank Tucker, Producer for Disney TV Animation, USA

"The verdict was unanimous — brilliant."
—Amiga Shopper Magazine, UK

"OpalPaint is in my opinion the best paint program currently available in the United States for the Amiga."
—The Amiga—Video Journal (AVID), USA

The OpalVision Main Board

A true 24-Bit frame buffer and display device with 16.8 million colors available for every pixel with a maximum resolution of 768 x 480 (580 PAL). An internal card, it operates automatically in NTSC or PAL mode in any Amiga computer with a video slot including the Amiga 4000. It's powerful VLSI graphics coprocessor enables stencil modes, a host of transition effects and smooth, hardware-controlled priority switching and scrolling/panning effects. The board's "Palette-Mapped" design updates screen colors in real-time for fading pictures in and out and changing their palettes on the fly. Every Main Board includes OpalPaint, OpalAnimMATE and Opal Presents! software.

OpalPaint *New! Version 1.5*

OpalPaint even in its first release was widely praised as the very best paint program on the Amiga. Reviewers have compared it favorably with the very best painting systems on the Mac and PC. Some even say it rivals professional broadcast systems costing $70,000.00! And now we've added even more powerful features:
Real-time chrominance effects. Interactively modify RGB response curves. Re-map an image's colors, change its brilliance or contrast in real time. You've got to see it to believe it. *AREXX control.* OpalPaint now includes the most powerful implementation of AREXX ever in an Amiga paint program. Unleash all of OpalPaint's 24-Bit image processing power from any program which supports AREXX. *The Magic Wand.* A real time-saver. Easily and quickly select specific ranges of colors interactively. Working with 24-Bit true-color has never been this simple! And that's not all. We've added *overscan painting, custom papertypes, real-time previews* of many image processing modes, and more!

OpalPaint is Fast. Real-time. Full 24-Bit. It gives you complete control over OpalVision's 16.8 million color palette. Includes a full-range of drawing tools and an expandable library of image-processing modes with adjustable parameters, complete texture-mapping capabilities, transparency and color gradients, multiple work modes, nozzle brushes and pre-defined palettes. Real-world "Artist's Tools" and customizable paper types, multiple stencil types and compatibility with the pressure-sensitive Wacom drawing tablet provide a level of support for artistic creativity never before available on the Amiga.

OpalAnimMATE *New Version! Now even faster!*

Run OpalVision animations at rates of up to 60 frames per second. It's features include 8, 12, 15, 18 and 24-Bit modes with selectable screen sizes from 32 x 20 to 768 x 286 pixels and will play anims directly from hard drive. Delta compression creates small files and fast playback rates. Create 16-million color animations using your favorite 3D rendering package and play them back through OpalVision!

Third Party OpalVision Software
(Available now or coming soon!)

Activa Int'l	Real 3D
ASDG	Art Dept. Pro & Morph Plus
Adspec	Aladdin 4D
Black Belt Systems	ImageMaster
SCALA	MultiMedia 200 & InfoChannel
GVP	Image FX & Cine Morph
Octree	Caligari 24
RGB Computer	AmiLink Video Editing Products
Amazing Computers	Transporter
Texture City	24-Bit image libraries
TecSoft	TV Paint
Progressive Peripherals	3D Professional
CEV Design	Video Visions
Electric Crayon Studio	24-Bit Clip Art
Michtron	Entertainment Products

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For flicker-free 24-Bit and Amiga graphics. Also acts as a separate 24-Bit frame store.

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Imagine 3D - the popular, best-selling Amiga 3D rendering software now supports OpalVision! And you can get a free copy ($450.00 retail value!) if you purchase an OpalVision Main Board. This isn't a stripped-down, crippled version. This is a full version of the most powerful, award-winning 3D renderer, Imagine 2.0, now with full OpalVision compatability!

Here's how it works: Purchase an OpalVision Main Board between February 1 and March 31, 1993. Send us a copy of the invoice with your name and address along with your OpalVision Warranty card and we'll send you a free copy of Imagine! U.S.A. orders include free shipping. Orders from outside the U.S.A. please include a $20.00 shipping and handling fee. Please enclose an international money order or furnish your Visa, MasterCard or American Express Card number and expiration date. Requests for Imagine and purchase documentation must be received by April 30, 1993.)



OpalAnimMATE offers real-time playback of animations created by ray-tracers, landscape generators, morphers and all other 24-Bit software.



The powerful new Magic Wand in OpalPaint lets you easily and interactively select specific ranges of color.



The new Alpha Channel feature of OpalPaint allows photo compositing with selectable transparency levels on a pixel-by-pixel basis.

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From p. 12.
define exact specifications. AMPlot2 has an extensive ARexx interface; in fact, you can plot data directly to a graph using ARexx. The software supports EPSF, IFF-DR2D, PostScript, and HPGL file formats; you can send files of the the latter two types to compatible plotters, printers, and interpreters. (RS# 160.)

Watch and Learn

Sometimes the only way to understand a product is to see it in action. So, instead of thumbing through a manual, fast forward through a videotape. **The Beginners Guide for Art Department Professional 2.+** ($39.95, ***Dreamworks Video Productions***) devotes one hour and 45 minutes to helping you master ASDG's ADPro 2. Topics covered include the Text Visual, Broadcast Limit, Negative, and Scaling operators; the Prefprinter Saver; the enhanced palette control; compositing images; antialiasing; ADPro's peripheral drivers; converting IBM-format graphics to the Amiga; ARexx; and FRED, the animation utility. (RS# 115.)

A videotape and booklet combination, **A3000/Toaster** (***L&N Productions***, $35) illustrates two methods of installing NewTek's Video Toaster in an A3000. The kit includes a coax cable for implementing the second solution. (RS# 116.)

It's a *Three* For All

Need RAM, an IDE hard-drive controller, and SCSI controller? ***ICD's*** **Trifecta**, available in several configurations, may be a good bet.

Trifecta accepts up to 8MB of RAM via four-megabit ZIP DRAM ICs. According to ICD, Trifecta's SCSI-2 hard-drive controller is the fastest available for the Amiga, with 10MB-per-second synchronous and 5MB-per-second asynchronous transfers. Data flow is full DMA on the bus and hidden DMA to the board's RAM, to keep your tasks moving.

Besides SCSI peripherals, you can connect with one or two low-cost 16-bit IDE drives. Quick-block transfers and intelligent caching promise to make Trifecta's IDE transfer rates comparable to those of 16-bit SCSI controllers.

A2000-series owners can choose from the **Trifecta 2000LX** ($249.96), which includes all the features, or the **2000EC** ($199.96), which excludes the SCSI-2 feature (a $69.96 plug-in upgrade lets you add this capability later). LX and EC models offer the same differences to Amiga 500 owners. The **500LX** ($349.96) and **500EC** ($299.96) come in external cases with pass-through connectors (to accommodate other bus expanders), switches to disable RAM and hard drives (for compatibility with finicky software), and power supplies. (RS# 151.)

Busy Blue

In a flurry of activity following the new year, ***The Blue Ribbon SoundWorks*** moved its offices and released one new product, two upgrades, and six data disks. The all-new product is **One-Stop Music Shop** ($649), a 16-bit sampler, sound editor, and MIDI interface. Based on the E-Mu Proteus SoundEngine, One Stop Music Shop comes with hundreds of ready-made 16-bit samples, as well as controls to handle 32 channels of digital-audio decoding and reconstruction in real time, to design your own instruments, and to mix and modify samples. The hardware component fits in an A2000, A3000, or A4000, while the software is compatible with SuperJAM! and Bars&Pipes Professional, both of which have been updated.

SuperJAM! 1.1 ($149) includes stereo TurboSounds, two-octave and split chords, multiple grooves per style, and more. Six new **Extras Disks** ($24.95 each, $59.95 for three, $109.95 for all) escort SuperJAM! to market, specializing in soundtracks, world music, dance mixes, pop/rock, classical, and the cutting edge.

Bars&Pipes Professional 2.0 ($429) is more than an upgrade, it's a liberation. No longer is Bars&Pipes restricted to manipulating music data, thanks to the Media Madness Tool Set. With it, Bars&Pipes becomes a multimedia tool that controls Video Toaster transitions, ANIM file playback, SunRize sound effects, genlocks, video decks, ARexx, and more. You edit your production in the Media Madness window, record it with the Media Madness Recorder, and play it back with the freely distributable Media Madness Player. Plus, the Player can synchronize to SMPTE, ARexx, and all of B&P 2.0's special accessories. On the music side, Bars&Pipes Professional 2.0 improved notation, editing, recording, and Music Box tools.

For more information on Blue Ribbon's latest line contact the company at its new home: Venture Center, 1605 Chantilly Dr., Suite 200, Atlanta, GA 30324 (404/315-0212). (RS# 117.)

Gettin' Better All the Time

The ever-expanding **Fred Fish Collection On-Line** (***HyperMedia Concepts***) leads the update parade this month. Release 1.5 of the CD-ROM includes the contents of disks number one through 750 of the Fred Fish public-domain software library. Registered owners can update to this new edition for $29.95, or you can purchase a subscription for $79.95 that covers releases 1.5 through 1.7. (RS #118.)

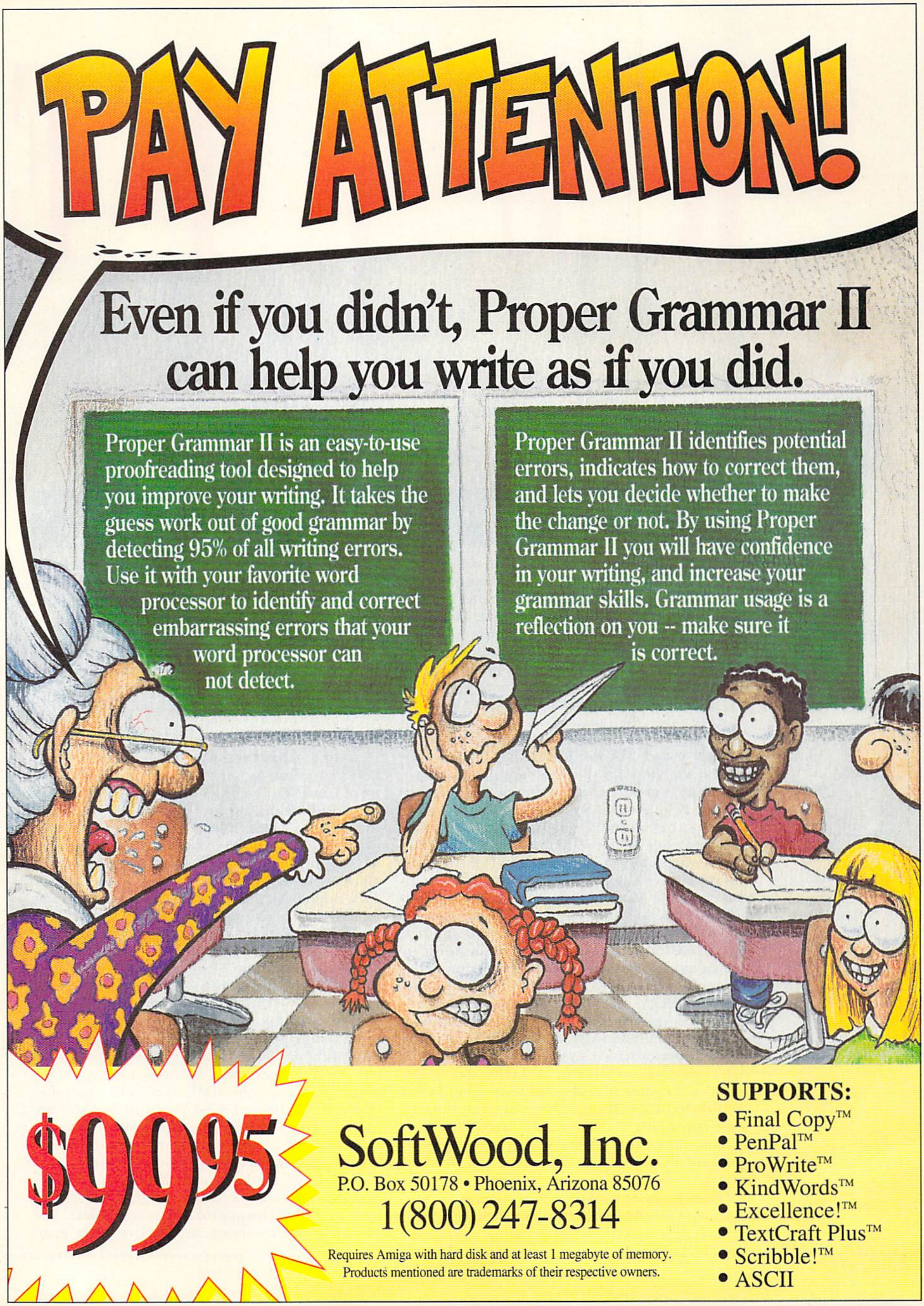
While the latest version of its popular 3-D modeler—**Real3D V.2** ($845)—comes from across the ocean, ***Activa International*** recently opened a North American office at 644 Queen St., Chatham, Ont., Canada N7M 2J6, 519/435-0988. You can change your working environment in Real3D V. 2, as well. The program lets you model in a tri-view editor, a nine-view editor with real-time rendered previews, or a single perspective-view editor. Version 2 also offers multiple creation techniques for its hierarchical objects. In addition to the solid modeling and Boolean operations of previous editions, Real3D V.2 employs quadric and free-form tools as well as B-splines and parametric surfaces. Landscapes and trees each rate their own fractal generators. You can now map and morph textures and materials on your objects in a variety of ways, plus define properties such as gravity and magnetism. The animation support was expanded, object morphing added, and rendering options increased, among other changes. If all this power is too much for your beginner's blood, the previous version of Real 3D is still available as Real3D Classic ($179). (RS# 119.)

Aesthetic-minded mathematicians will be pleased that **MathVISION 2.4** ($223, ***Seven Seas Software***) now renders to NewTek's Video Toaster and GVP's 24-bit display cards. The new version of this function plotter also sports new functions, such as the ability to launch ARexx scripts, and is available to registered MathVISION owners for $49. (RS# 120.)

INOVAtronics' **CanDo! Version 2** can do even more than earlier releases of this software-authoring environment. New features include Script Bookmarking, which allows you to return to certain scripts by pressing one or two keys; a SuperDuper tool, which lets you automatically insert complete spreadsheet-style columns and rows of buttons, fields, and sliders into your application; and an Object Layer tool that can change the hierarchy of your objects. There are also new facilities for error checking, file-change monitoring, and more. Of course there are scores of enhancements to previously existing features as well. Current owners can upgrade for $105. (RS# 121.)

Finally, we have an update of a different sort—a revision to the GigaMem review in Jan. '93 (p. 24). **GigaMem** is now distributed and supported by INOVAtronics, 98499 Greenville Ave., Suite 209B, Dallas, TX 75231, 214/340-4991). The price for the virtual-memory simulator remains at $149.95. (RS# 121.) ■

Send news, new products, and network information to Overscan, *AmigaWorld* Editorial, 80 Elm St., Peterborough, NH 03458.



Circle 87 on Reader Service card.

REVIE

Derringer 030

Computer Systems Associates, **from $249.95.**
A500, A2000.
Internal, CPU-socket connection.
Installation: Easy.

25 MHz 68030 accelerator with coprocessor socket and up to 8MB of 32-bit RAM.

040/500

Progressive Peripherals & Software, **from $1295.**
A500.
Internal, CPU-socket connection.
Installation: Moderate.

28 or 33 MHz 68040 accelerator with 4MB or 8MB of 32-bit RAM.

Think back for a moment to when your Amiga 500 was new. Remember how quickly it accomplished tasks? Things seemed to happen at almost the speed of light. Then, one day, you found yourself actually waiting for the computer, instead of the other way around. What happened? Did your reaction times speed up that much? Did the speed of light slow down? Most likely you discovered desktop publishing, 3-D modeling, or some other computation-intensive application. The solution is to crank up your computing power a notch or two. The two newest and highest-powered accelerators for the A500 are the Derringer 030 from Computer System Associates, and Progressive Peripherals & Software's 040/500.

The actual numbers generated by benchmark programs tell little by themselves. Their value comes when making comparisons. The results in this review (see Table 1) were generated on a standard Amiga 500, an A3000 with a 25 MHz 68030 and a 68882, and three test boards installed in the A500. All systems were booted with the standard Workbench 2.0 startup-sequence to eliminate different background tasks that could affect performance. The only exception to this was to move Kickstart into 32-bit RAM in each test. The benchmark program used was AIBB version 5.0, by Lamont Koop.

While the numbers give a good indication of the different performance levels available, most of us don't relate well to MIPS or MFLOPS, so I've also included a couple of real-world tests. First, I used WordPerfect (WordPerfect Corp.) to count through a file containing 100,000 words. Secondly, I used version 1.21 of Vista (Virtual Reality Labratories) to generate a sample scene. The scene was Olympus Mons, included with Vista, with all controls set at their defaults, except that Blend, GShade, and PDither were turned on, and Polygon was set to 1. These settings give the most life-like pictures, and increase the rendering times quite a bit. I used the standard version of Vista with the base A500 and the version optimized for advanced processors and math coprocessors for the other systems. I ran the tests several times and averaged the results.

To locate the vendors of the products reviewed, see the "Manufacturers'/Distributors' Addresses" list on p. 118.

Derringer 030

First up was the Derringer 030, equipped with a 68030 processor with the MMU (Memory Management Unit), running at 25 MHz. It also has a socket for a separate math coprocessor (68881 or 68882) that can be clocked independently of the 68030 at up to 50 MHz. The six-layer circuit board also has a connector for attaching a single standard SIMM, allowing up to eight megabytes of 32-bit memory to be added. Future DRAM chips should boost this to a 32 meg maximum. The test board included the 50 MHz 68882 math coprocessor and four megs of 32-bit RAM.

You can install the Derringer in either an A500 or A2000, and although the six-page manual seems rather sparse, it covers both configurations in detail. Also included is a disk with software that, among other things, allows you to reboot your system with its original 68000 processor. Unlike many accelerators and Commodore's 68030 systems, the Derringer doesn't use the MMU to copy Kickstart into 32-bit RAM. Instead, CSA uses special hardware and its D3 program. Copying D3 to your C directory and inserting a line in your startup-sequence adds the new memory to the system. Copy Kickstart and approximately 7K of system tables and stacks into this RAM for a significant systemwide speedup. This approach leaves the MMU free for use by other software, such as Unix, Mac emu-

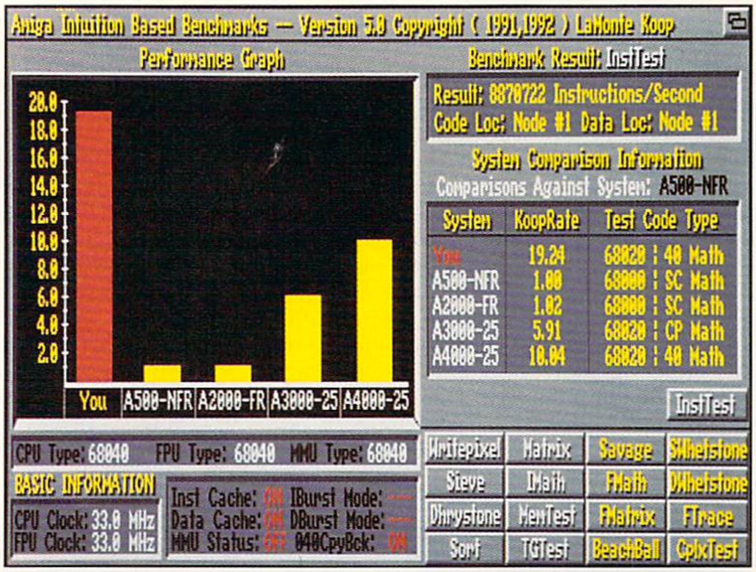
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lators, and programs that treat your hard disk as a huge pool of virtual memory.

Installation of Derringer and the PP&S boards is similar. First, remove the plastic case and the metal RF shield, and then pry out the 68000 microprocessor. You next insert the 68000 into a socket on the new board, then plug the board into the vacant CPU socket on your motherboard. Replace the shield and plastic case and you're done. The only special tool you'll need is a Torx T-10 screwdriver to open the case. Be aware that this voids your computer's remaining warranty. If you're nervous about digging around inside your Amiga, a dealer should be able to install any of these boards for a minimal service charge.

040/500

Progressive Peripherals & Software, after rebuilding from a devastating fire, has begun shipping 28 MHz and 33 MHz versions of a 68040 accelerator for the A500. The most startling feature of these systems is the small fan mounted directly above the CPU chip.



The 33 MHz '040/500 outperformed the competition in the benchmarks, as the red bar above shows.

I was a bit leery of putting something that got hot enough to require its own fan inside my A500's case. The fan, however, pulls air in from the top of the case, blows it onto the chip, then forces it out of the case, so the plastic top actually was cooler than with the less powerful 68030 installed.

The fan requires an additional installation step. To supply power for the fan, you must unplug the internal floppy's power connector from the motherboard, and plug it into the 040/500's connector. Then, using the supplied cable, connect the motherboard to the 040/500, daisy-chaining the drive and fan power. The only physical problem I had with any of these boards concerned this power connection. The cable from my drive was just barely long enough to reach the new board, and the longer cable supplied with the accelerator would fit ►

TABLE 1. DERRINGER AND 040/500 ACCELERATOR BENCHMARK TESTS.

Test	A500	A3000/25	Derringer	'040-28	'040-33
Writepixel	111.13	28.58	35.50	29.92	26.86
Sieve	78.61	7.15	7.86	2.87	2.55
Dhrystone*	1,335	9,803	7,889	34,580	40,757
Sort	70.01	8.33	10.14	2.45	2.11
Matrix	28.07	2.35	2.78	0.93	0.81
IMath	105.92	5.13	5.56	2.01	1.71
MemTest	54.98	6.92	6.57	2.40	2.08
TGTest	12.49	6.07	6.51	5.18	5.16
Savage	797.08	3.37	1.71	2.54	2.15
FMath	86.89	3.00	1.85	0.30	0.25
FMatrix	39.08	4.50	3.93	0.87	0.76
BeachBall	1242.53	28.40	24.41	16.28	15.35
SWhetstone*	22,228	1,923,068	2,740,141	5,175,838	6,208,318
DWhetstone*	24,057	2,173,927	3,160,354	4,809,070	6,012,968
FTrace	561.11	4.00	2.41	1.81	1.53
CplxTest	49.55	5.78	5.90	1.27	1.08
Word count	2:57.3	33.9	30.6	8.4	7.3
Vista	43:28.9	3:21.3	3:47.8	3:25.9	3:51.3

NOTE: Numbers are minutes:seconds.tenths to complete test except *, which are number of repetitions per second of test.

every connector except the one on my disk drive.

The 040/500 board includes either four or eight megabytes of 32-bit RAM; no other configurations are possible. The Progressive systems come from the factory with the Kickstart 2.04 ROM chip installed. The supplied software includes a program to move Kickstart while leaving the MMU free. A second utility lets you reboot your computer with either microprocessor and from either the ROM on the accelerator or the one on your motherboard. While operating a 68040-based system under Workbench 1.3 is not recommended, the 52-page manual includes scripts you can insert into your startup-sequence to allow this. The disk from Progressive includes the Commodore hard-drive installation program that makes the software installation painless.

If the 68030 represents a giant leap in computing power over the 68000, the 68040 takes a quantum leap. This chip includes a math coprocessor, larger data and instruction caches, and the MMU all in one package. Software compatibility under 2.04 is high, and most problems can be solved by turning off the copyback mode. Commodore's Clock program, for instance, requires this or else the system crashes.

Physically, all of these boards cover the Agnus chip, the Kickstart ROM, and other sockets that products from enterprising companies plug into. If you have made any modifications in these areas, check with the respective manufacturers before buying an accelerator. Also be aware that older hard-drive interfaces may need to be upgraded to work properly with the faster processors, and some external memory units may not work. Speaking of memory, these processors need 32-bit RAM to achieve their full potential. You won't be happy without adding the memory too.

Speeding Tickets

Will these boards make your A500 the equivalent of a new A3000 or A4000? In some respects, yes, in others, no. Remember that all graphics and sound data must go through your existing chip RAM, which remains 16 bits wide and slower than your new processor. On the other hand, with only a modest investment, you can turn your mild-mannered A500 into a real screaming number masher.

—Rob Hays

Aladdin 4D

***Adspec Programming*, $499.**

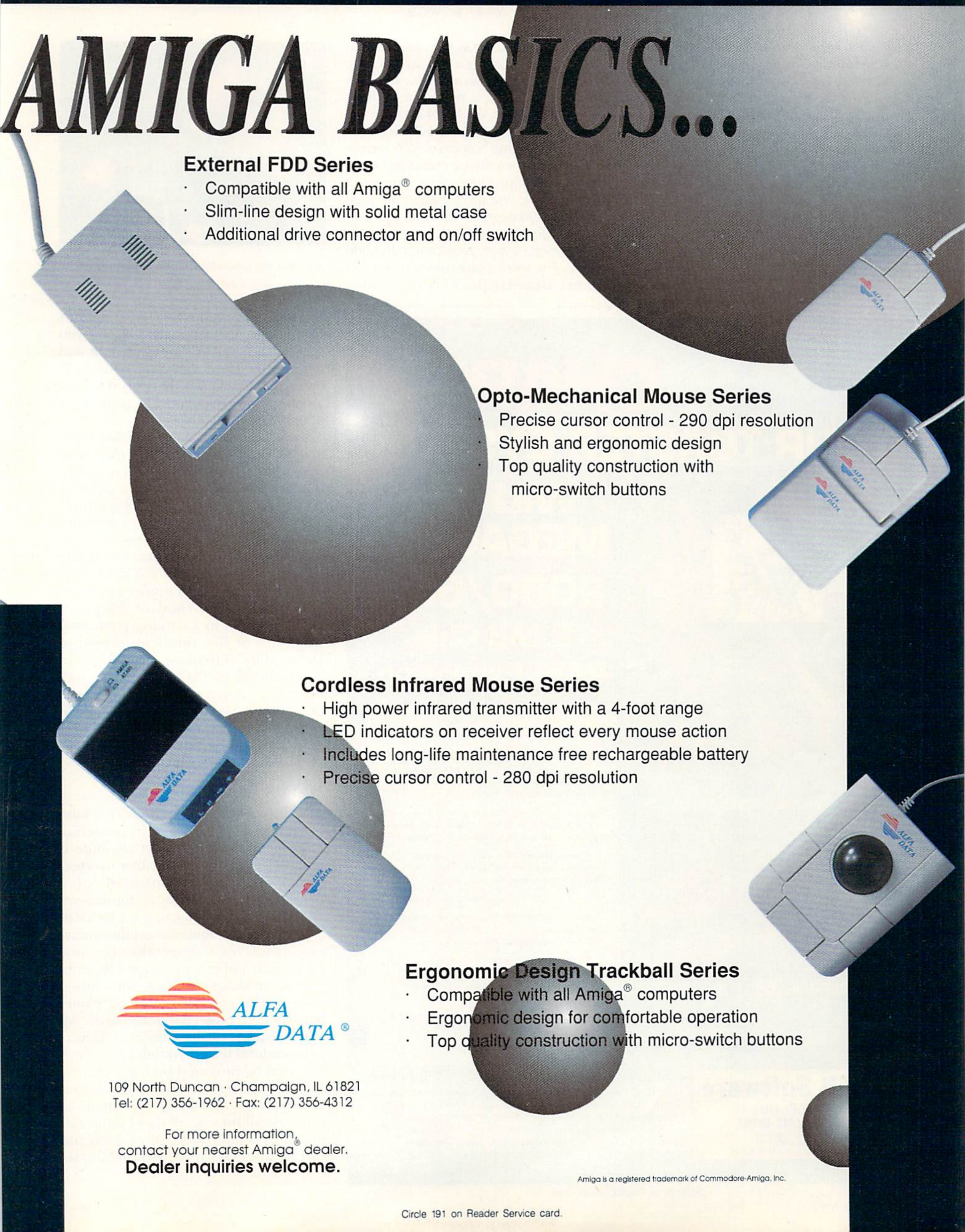
Hard-drive installable.
Not copy protected.
2.0 compatible.
Accelerator compatible.
Minimum system: 2MB of RAM.
Recommended system: 10MB of RAM, 68030 accelerator, math coprocessor, and hard drive.

Professional 3-D modeling and animation.

The desktop 3-D modeling and animation field's quality and size are rapidly increasing—as evidenced by the latest entry, Aladdin 4D. While it's not a true ray-tracing program, you will find Aladdin's unique rendering abilities and polished results worth a look.

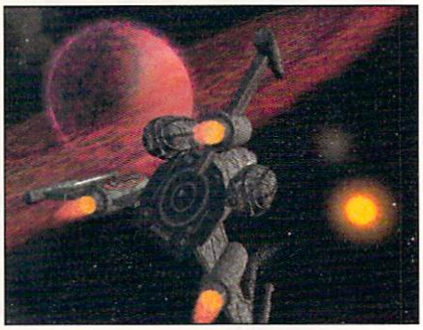
One Window, Many Views

Aladdin 4D uses a one-editor interface in which you model objects, as well as lay out animation movement. You can configure the editor window as perspective space (view the objects from any angle you wish), flat views from the X, Y, or Z axis, or as an isometric view. The isomet- ►


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Circle 191 on Reader Service card.

ric view is helpful because it eliminates all reference to perspective; you can align objects without regard to distance from the viewer. You can also rotate your editing space in real time about one or two axes by simply using the number-pad keys. While I found the supplied views very useful, I missed the quad view (flat X,Y, and Z and a perspective) found in many 3-D programs.

Aladdin 4D's modeling capabilities are not its outstanding feature. If offers the basic controls—polygon extrusion, extrusions along a path, point and polygon editing, magnetism, sweep, and mirror. An interesting addition is a slant tool to deform an object along a specific axis. The extrusion controls also have the ability to swell or contract in a nonlinear manner during the process. While not a critical factor, the increasingly common Boolean operations for cutting holes in objects are not included. For primitives, only a rectangle and an arc are provided; thus, to create a simple sphere you must add an arc then sweep for 360 degrees. The arc, however, can include up to different 16 radii for easy creation of stars, gears, and other odd shapes. For ready-made objects, you can import Draw4D/Draw4D Pro, Video Scape, Scenery Animator, and some EPS file formats. To produce text objects, you simply load an Aladdin-format font and type. For total flexibility, you can manually enter point positions, but this is a little awkward for manipulating large numbers of points or polygons.



Aladdin 4D lets you create gases, both cosmic and earthly.

A unique aspect is the fact that point and polygon movements are relative to the mouse pointer, not tied to it. In this manner, you can even move a point or polygon off the screen and still control it. You can also hide any points or polygons that clutter the space when you are editing a detailed object, thanks to Aladdin's unique multiple spaces. You can create, manipulate, and even render any number of 3-D spaces. Think of this just as multiple pages in a desktop-publishing program, or like the jump screen in DeluxePaint (Electronic Arts). You can move objects to 3-D Space 2 and work only on the object in Space 1. When you are finished, you can then jump the objects back into Space 1. This is a very quick method to hide things or do test renders only on specific objects.

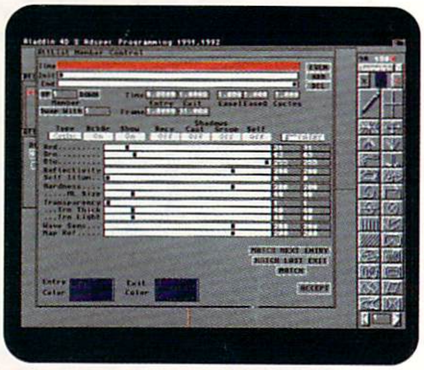
HI-TEST RENDERING

Aladdin's real power and one-of-a-kind (currently) abilities are in its rendering engine. My favorite object attribute is gases. Aladdin 4D lets you turn an object into a gas with full control of color, density, turbulence, texture, movement, and much more. You can even factor in fractal noise routines to assist the animation. This is very different than Fog used by Aladdin and other programs. Gas objects have shape and size and can be moved. This creates spectacular planet atmospheres, rocket flares, and so on. Aladdin also lets you have unlimited layers of procedural textures or bitmaps, which can even be projected onto gas objects. In addition, you can use bump maps, reflection maps, and illumination maps as textures. All these attributes can be animated with full control of ease ins and ease outs at every level. You can also se- ►

lectively apply Facet, Gouraud, or Phong shading to objects and have them accept and cast shadows. Plus, Aladdin 4D's wave functions let you animate ripples across objects. The number of controls and ability to animate changes in attributes to this degree far exceeds most other 3-D programs.

How fast does the rendering engine do all this? It isn't the fastest, or the slowest, but you should be satisfied if your system has the recommended configuration. There is direct support for standard Amiga displays as well as DCTV (Digital Creations), Firecracker 24 (Impulse), Resolver (DMI), and OpalVision (Centaur Development). You can render to a maximum of 32K by 32K in full 24-bit resolution. There are routines that antialias bitmap textures also, which helps prevent the pixelization that can occur when you get too close to an object.

The hardest part in learning this program was "unlearning" how most other 3-D programs work. Aladdin 4D's interface is very different. Because it utilizes only one editor interface for everything, you set up your animations in perspective space and never set a "Stage" or a specific "Frame" of the animation. All the objects involved in the animation are in the editor even though attributes or positioning may prevent you from seeing them. At any point you can see a real-time wireframe preview of your animation of any specific frame by hitting a function key. This method precludes the ability to do traditional key frames. Adspec Programming suggests that you can use the Deform option to do key framing, but this is a rather limited method. Once you are used to this idea, however, having to learn only one editor could be a major time saver.



Aladdin's Attribute requester helps you customize your objects.

Overall, I found the program and interface to be full featured and very capable. The program seems stable and I found the tech support to be knowledgeable and helpful. Aladdin 4D's documentation provides informative tutorials, a reference section, and an index. The section and page numbering scheme, however, makes it difficult to locate information from the index. Aladdin isn't the best choice for your first or only 3-D tool, because some of the controls can seem overwhelming. But if you are looking for some new effects and are willing to learn a different approach, put Aladdin 4D on your wish list.

—Steven Blaize

VECTOR

***Interactive Video Systems,* from $799.**

A2000, A500 with modification.
Internal, CPU connection.
Installation: Easy to moderate.

25, 33, or 40 MHz 68030 accelerator with FPU, 32-bit memory and on-board 32-bit SCSI host adapter.

Squeezing the equivalent of five expansion cards into the Amiga's CPU slot, Vector provides a 68030 processor with

Continued on p. 28.

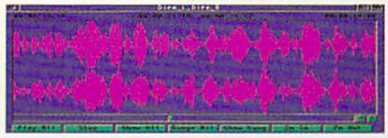
16 Bit Desktop Audio

AD516

The AD516 hardware provides stereo in/out connectors, plus a SMPTE in. Just plug your VTR, CD player, radio, tape deck, or other audio source directly in. Then record in stereo, direct to hard disk, with 16 bits at sampling rates up to 48,000 samples per second. Plus, the AD516's efficient design allows 8 track playback direct from hard disk. The AD516 can synchronize and chase SMPTE time code at 24, 25, 29.97, and 30 fps (drop or non-drop frame). Designed to exceptional audio standards, the AD516 offers 15Hz to 22KHz frequency response and 85dB dynamic range.

Waveform Editor

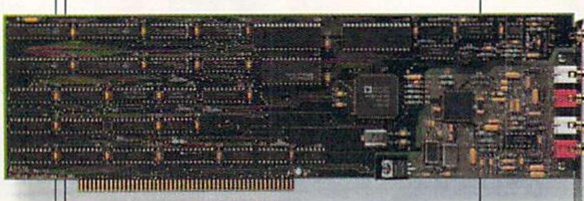
The Studio 16 sound editor graphs the audio waveform and allows you to cut, copy, and paste audio. Up to eight samples



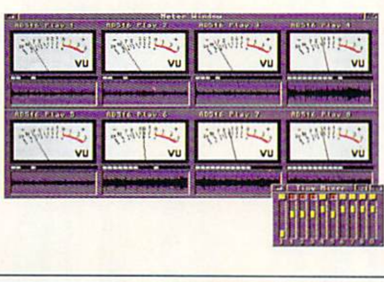
can be edited per window. And edits can be non-destructive or permanent. Zoom, scale, fade, reverse, echo, normalize, loop FFT, resample, and many other functions are available. Named regions can be defined and used in the cue list or transport modules.



Professional Digital Sound for Your Video, Music, and Radio Productions



Finally, true CD quality 16 bit audio is available for your Amiga! SunRize's new AD516 gives you eight tracks, plus a time code reader and a DSP chip. Included with the AD516 is Studio 16™ version 2.0. This new release of our popular 16 bit editing software puts a complete sound studio on your desk!



Video Production

The Video Toaster goes a long way towards solving your video problems. But what about sound? Do you want to do ADR or voice-overs? Do you need to synchronize background music with your productions? How do you add footsteps, door knocks, and other sound effects to your video or animation? Do you need to fade, cross fade, or eliminate sections of audio? Can you edit your audio, or are you stuck with the first take? Studio 16 solves all these problems by turning your Amiga into a complete sound studio. With Studio 16's cue list and SMPTE support you can lock sounds frame accurately with your video. Audio triggers reliably, at the same spot, every time. Or you can slip your audio effects, trying them at different spots. And since Studio 16 plays directly off hard disk, the number of sounds you can trigger is unlimited.

Mixer and Meters

Each of Studio 16's eight tracks can be metered and mixed. Unlike two track systems, Studio 16 can combine multiple tracks with no generation loss. And it can record two tracks while playing up to eight!

DSP Supercharger

The AD516 includes a special sound coprocessor - the advanced 2105 DSP. The DSP allows Studio 16 to handle those eight tracks while performing real time mixing. The DSP can also do high quality 16 bit effects such as echo, flange, delay and chorus.

Low Prices, High Performance

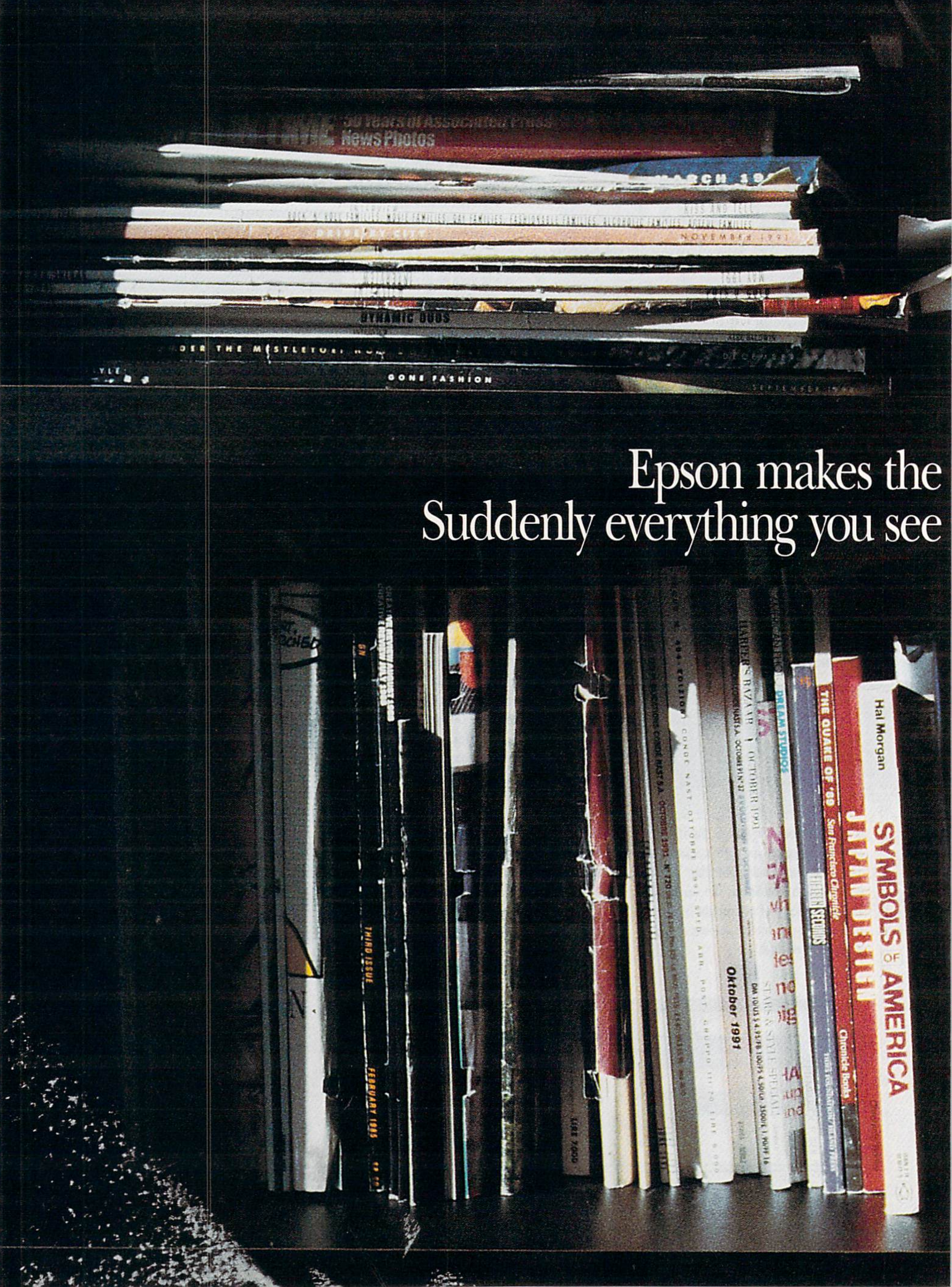


Studio 16 2.0 comes with either the AD516 (16 bit, 8 track, stereo, $1495 list) or the AD1012 (12 bit, 4 track, mono, $595 list). Also available is the DD524 digital I/O card for direct interface to DAT. **Call today for a free Studio 16 information packet. Tel: (408)374-4962. Fax: (408)374-4963.**

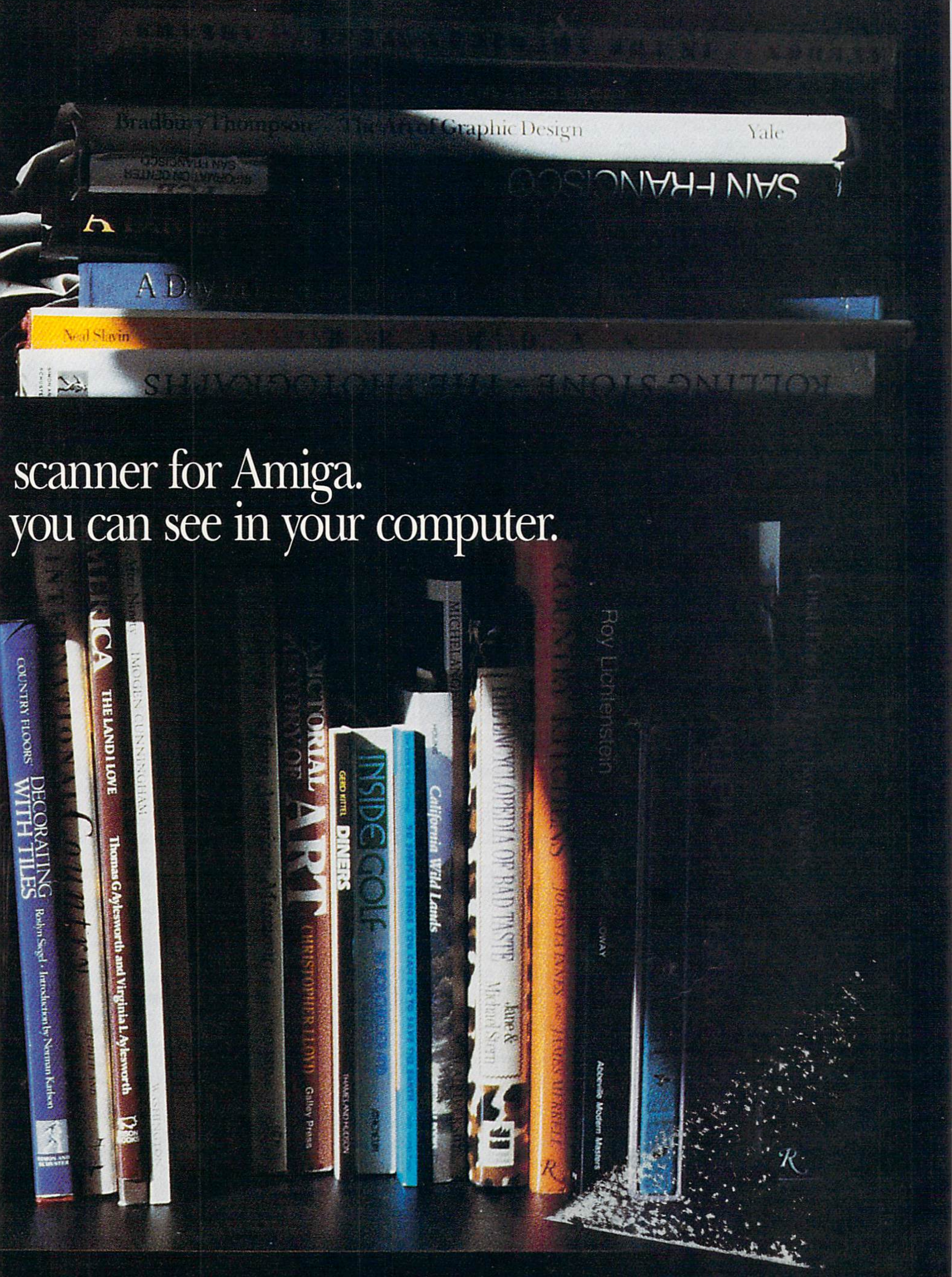
SunRize INDUSTRIES

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IMOGEN CUNNINGHAM
PICTORIAL HISTORY OF ART
CHRISTOPHER LLOYD
Gallery Press
DINERS
INSIDE GOLF
California Wild Lands
THE ENCYCLOPEDIA OF BAD TASTE
Jane & Michael Stern
Roy Lichtenstein
Abbeville Modern Masters

From p. 24.
68882 math coprocessor, a SCSI adapter with internal and external 50-pin connectors, a hardcard, on-board 32-bit RAM, and connectors for an optional 32-bit RAM card. PRO-PLEX is Vector's unique claim to fame. With PRO-PLEX, Vector's 32-bit SCSI host adapter and up to eight megabytes of its 32-bit RAM are automatically reconfigured as 16-bit resources when you switch the system to native 68000 mode.

Basics and Beyond

Vector's basic configuration includes a 68EC030 microprocessor with a 68882 math coprocessor, but you can order the board with any combination of 68030, 68EC030, 68881, or 68882 chips running at clock frequencies of 25, 33, or 40 MHz. The 68EC030 lacks an on-chip memory management unit (MMU), but is otherwise identical to the 68030. An MMU lets you relocate the Kickstart ROM code to high-speed 32-bit RAM for faster operation. Vector's FastRom feature, however, lets you do the same with a 68EC030. In fact, you should use FastRom to move Kickstart even if an MMU is available, because it runs the code slightly faster than an MMU does. A second clock unit can be installed on Vector to run the math coprocessor at a higher speed. The 68030's clock speed can also be upgraded, but some factory modifications to Vector are needed. Note that Vector's clocks run at twice the speed of the associated processor.

Vector's eight memory sockets can be populated with one- or four-megabyte SIMMs. Because SIMMs must be added four at a time, the available combinations are 0, 4, 8, 16, and 32 megabytes. (Remember, you cannot mix one- and four-megabyte SIMMs.) When all eight SIMMs are installed on Vector, 32-bit memory access is slightly faster. For more 32-bit RAM (up to 112MB), you can plug a card, such as DKB Software's DKB 2632, into Vector's A2630-compatible connectors. In 68030 mode, all of Vector's RAM autoconfigures as 32-bit RAM into the system. PRO-PLEX also makes up to eight megs of RAM available to the 68000 microprocessor as a pair of four-meg RAM boards. For compatibility with Bridgeboards and 16-bit RAM cards, you can disable either the upper four or the entire eight megabytes of Vector's 32-bit RAM in 68000 mode by setting on-board jumpers. The jumpers have no effect in 68030 mode.

Vector's on-board SCSI host adapter is based on IVS' high-speed Trumpcard Professional series. Because Vector replaced my IVS Grand Slam card and a Commodore A2630, I was able to retain all of the data located on six partitions on two hard drives by simply rewriting the rigid-disk blocks with Vector's TC Utils hard-drive set-up program.

The entire reconfiguration took only a couple of minutes as TC Utils automatically identified all the partitions. PRO-PLEX even makes the SCSI controller and both hard drives available to the 68000 in 16-bit mode. Plus, the controller supports IVS' SCSI-Share network that lets several IVS-controller-equipped Amigas share multiple SCSI peripherals. Once you have a drive, you can convert Vector into a hardcard easily; all the necessary parts—including a 50-conductor SCSI ribbon cable—are provided.

You connect SCSI devices to Vector via the board's 50-pin, flat-ribbon connector. A second 50-pin, Centronics-style SCSI connector is located on Vector's rear mounting bracket. The latter necessitates some maneuvering when you plug Vector into the A2000's CPU slot. I recommend removing the back mounting screws on the A2000's built-in power supply before you start.

Vector is compatible with the Amiga 500. No suitable enclosure is available currently, however, and you must modify the A500 to connect the 7.14 MHz clock signal to one of the expansion port's 86 pins. An on-board jumper converts Vector for operation with an A500.

You access Vector's operating options via the mouse. To bring up the Vector Boot Options Menu screen, hold down the right mouse button after a system reset. You can then select 68030 or 68000 mode, enable or disable 32-bit RAM, specify autobooting for your hard drive, transfer Kickstart ROM to 32-bit RAM, and control the 68030's burst mode and RAM caches. All options default to Vector's on-board jumper settings. The 68030 or 68000 operating modes survive a warm boot and remain in effect until you shut off the machine or change the settings. Vector automatically disables the hard drives when a bootable floppy is in df0:, but you can still mount the hard-drive partitions by holding down the left mouse button.

As Good or Better

I tested a Vector board with a 25 MHz 68EC030, a 68882, and eight megs of 32-bit RAM. Whether an additional 16-bit, four-meg RAM card was installed or not, the system had access to eight megs of fast RAM in 68000 mode and as much as 12MB (four of 16-bit RAM and eight of 32-bit) in 68030 mode. To insure objective results, I used Lamont Koop's AIBB to benchmark Vector and compare its performance against a 25 MHz A3000. (See Table 1.) The performance was virtually identical to that of the A3000. Michael Sinz's DiskSpeed v4.2 evaluated the performance of Vector's SCSI controller with a Quantum LP105S hard drive and with a SyQuest 88MB re- ►

Table 1: Vector Versus the A3000 Benchmark Results

	A2000	A3000	A2000 with Vector
WritePixel	0.25	1.00	1.00
Sieve	0.13	1.00	1.00
Dhrystone	0.18	1.00	1.01
Sort	0.14	1.00	1.00
Matrix	0.14	1.00	0.99
IMath	0.15	1.00	1.01
MemTest	0.17	1.00	0.89
TGTest	0.52	1.00	0.95
Savage	0.19	1.00	1.05
FMath	0.21	1.00	1.00
FMatrix	0.17	1.00	1.00
BeachBall	0.19	1.00	1.02
SWhetstone	0.19	1.00	1.03
DWhetstone	0.18	1.00	1.04
FTrace	0.19	1.00	1.05
CplxTest	0.18	1.00	1.04

Table 2: Vector DiskSpeed 4.2 Results

With Quantum L105S Hard Drive:	
Testing directory manipulation speed:	
File Create: 19 files/sec	CPU Avail: 0%
File Open: 86 files/sec	CPU Avail.: 0%
Directory Scan: 273 files/sec	CPU Avail.: 0%
File Delete: 210 files/sec	CPU Avail: 0%
Seek/Read: 53 seeks/sec	CPU Avail: 0%
Testing with a 262144-byte, MEMF_FAST, LONG-aligned buffer:	
Create file:541488 bytes/sec	CPU Avail: 16%
Write to file:792454 b./sec	CPU Avail: 24%
Read from file:802154 b./sec	CPU Avail: 44%
With SyQuest 88MB Removable Media Drive:	
Testing directory manipulation speed:	
File Create:17 files/sec	CPU Avail: 0%
File Open:69 files/sec	CPU Avail: 0%
Directory Scan:260 files/sec	CPU Avail: 0%
File Delete:127 files/sec	CPU Avail: 0%
Seek/Read:56 seeks/sec	CPU Avail: 0%
Testing with a 262144 byte, MEMF_FAST, LONG-aligned buffer:	
Create file:550178 bytes/sec	CPU Avail: 11%
Write to file:829165 b. /sec	CPU Avail: 17%
Read fr. file:831188 b./sec	CPU Avail: 47%



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movable-media drive. (See Table 2.) Subjectively, I felt that Vector performed equal to or better than the A2630 that it replaced. In addition, hard-drive access definitely seemed snappier.

Overall, Vector is a high-performance, multifunction board from a reliable company with a consistent track record. If you're looking for an accelerator with maximum RAM expansion, Vector is well worth considering. If you also need a SCSI controller with availability of RAM and hard drives in 68000 mode, look no further.

—Morton Kevelson

SupraFAXModem Plus / SupraFAXModem v.32bis

Supra Corporation $219.95 and $479.95 respectively.

All models.
External, serial-port connection.
Installation: Easy.
Hard-drive-installable software.
Not copy protected.
2.0 compatible.
Minimum system: 1MB of RAM.
Recommended system: 1MB chip RAM, 1MB fast RAM, hard drive.

Personal and small business faxing and data transfer.

When the street price for even the cheapest fax machine is hovering around $400, an Amiga fax system that promises nearly the same performance for a street price of $165 deserves close attention. The SupraFAXModem Plus is just such a deal, including not only a 9600-baud fax/2400-baud data modem, but also a cable, ATalk III telecommunications software, and GPFAX software. For a bit more, you can get the 14,400-baud SupraFAXModem v.32bis. If you add the do-it-yourself ROM chip upgrade, the high-speed modem gains a CallerID feature.

Just the Fax

While I tested the entire 9600/2400-baud SupraFAX bundle, this review focuses on the software. The modem itself, which includes a complete Hayes AT command set, and ATalk III performed flawlessly.

The excellent GPFAX interface sports four control quadrants. The first handles program set-up functions—customizing the headers transmitted with each fax, setting page and font definitions, specifying serial-port and modem initialization strings, and creating cover sheets. Although limited to two-color renditions, GPFAX can translate IFF scans of logos and other artwork for a customized look. With the quadrant's phonebook you can define a permanent list of fax recipients, with automatic or manual dialing instructions, the cover sheet choice, and header information. The second quadrant controls the transmission, reception, and report-log updating. The third covers converting files to faxes, printing and viewing incoming and outgoing faxes, plus a scheduler program that lets GPFAX automatically send faxes to a specified machine or group at a predetermined time (such as after long-distance rates drop). Finally, the computer-control quadrant lets you iconify or exit the program. GPFAX handles all these chores simply and elegantly.

GPFAX carries this philosophy over to its operation side, as well. Whether running in the fore- or background, the program inserts a special printer driver (actually a fax generator) into your system that traps anything sent to the printer. For example, compose a fax in a word processor or desktop-publishing program and tell the program to print it; GPFAX intercepts the print instruction ►

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+ 32MB RAM Expansion!

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With today's RAM-intensive and processor-intensive software, and upcoming '040-optimized graphics software, you'll get more out of your Amiga 2000™ than ever before with the Progressive '040. The Progressive '040 is compatible with a wide range of hardware and software, plus AmigaDOS 1.3, 2.0, and 68000 mode is software-selectable.

RAM expansion costs LESS for the Progressive '040 than most '030 accelerators! Compare the cost and performance of a 16MB Progressive '040 to a 16MB '030, and the choice is clear.

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Zeus is available in 28MHz and 33MHz speeds to fit your budget. Zeus is economical to expand - from 4MB to 64MB in over a dozen RAM configurations, using industry standard, low-cost 1MBx8 and/or 4MBx8 SIMMs.

Zeus is packed with features and performance: autoconfiguring RAM, software and hardware 68000 fallback mode, AmigaDOS 1.3/2.0 compatibility, external SCSI-2 port and more, all on a single easy to install board.

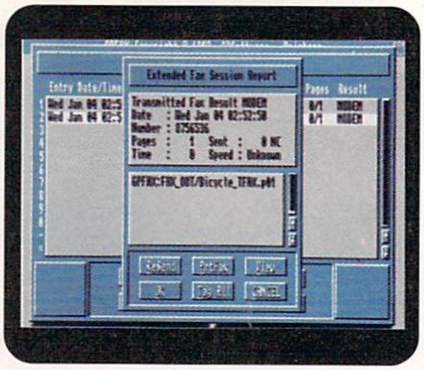
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and creates a ready-to-fax file. The software does an excellent job of converting full-color graphics to grayscale images that fax well. Of course, this technique works with any existing file, and the program directly converts files, as well. GPFAX even gives you the opportunity to view your fax before transmission. Upon receipt, you can view a fax on screen, print it, or save it in IFF format. The program automatically switches between its fax driver and your Preferences printer drive as necessary.

GPFAX's real power lies in its features and flexibility. For example, you can easily configure the program—in conjunction with the SupraFAXModem—to correctly handle fax, data, and voice calls. If it senses a fax tone, it activates and begins receiving. If your telecommunications or BBS software is running concurrently and can share the serial port, GPFAX lets it respond to a data call. If none of the above are true, your answering machine is allowed to kick in, on the assumption that the incoming message must be a voice call. GPFAX can even be configured to screen out junk faxes by checking incoming numbers against your phonebook and refusing to accept transmissions without a match. GPFAX also implements ARexx with more than 40 commands for nearly total remote control. The provided sample scripts should get you started. The very comprehensive manual will answer any other questions. Setting the program up, toggling your option decisions, and transmitting your first fax might take all of 30 minutes. . .if you're a slow reader.



The SupraFAXModem's GPFAX software automatically sends faxes and reports back to you.

No matter how easy the program is to use, a deciding factor is the quality of its transmissions. GPFAX's quality is excellent. In head-to-head tests with my $1400 office machine, the program outperformed it every time for image clarity and quality. Graphics and type both looked superior.

Static on the Line

Does GPFAX have any negatives? A few, but frankly I'm picking nits at this point. The first is speed. The program can take from one to three minutes to convert your file to a fax-ready state. (Of course, you eliminate the step of printing the document that traditional fax machines require.) A 10–15 page report could take nearly 30 minutes to generate and another 15 to transmit; keep this in mind if you're a high-volume faxer. For personal, home, and small business use, GPFAX's speed is more than adequate and its high level of automation gives it features even my office machine can't match.

My second small gripe is that GPFAX doesn't give you the option of naming your faxes. It uses sequential numbering (for example prt004.p01), with a prefix that indicates whether the fax was generated through the printer driver or directly from a text or IFF file.The numbers are then stored in the Fax-Out drawer. If you generate several files at once, it's very difficult to remember their order and content. At least the View Fax option lets you double check

Continued on p. 92.

THE AGA ISSUE... Y&U

WITH THE RECENT introduction of the A4000, closely followed by the A1200, Commodore is making a statement about the future of the Amiga. In the immediate sense, that statement can be summed up in three letters: AGA.

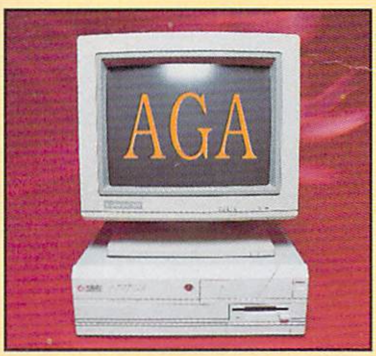
The AGA (for "Advanced Graphics Architecture") chip set offers tremendous potential for enhanced color and vastly improved resolution. By positioning the A4000 at the high end (following the A3000) and the A1200 at the low end (a logical replacement for the A500), the company is being serious about how it intends to develop the entire product line in the foreseeable future. For Amiga owners who have suffered through some past indecisiveness on the part of CBM, this demonstration of clear purpose is welcome news.

The AGA revolution, however, is bound to elicit questions, confusion, and even anxiety among Amiga users. That's why *AmigaWorld* is devoting a three-pronged special feature section this month to an examination of the AGA issue from every conceivable vantage point.

Our first feature, "The Big Decision," provides an overview that raises the questions on the minds of many Amiga owners: What are the benefits of AGA? Should you upgrade to the new line or stay with your present system? Will those who don't upgrade be left with "orphan" systems by Commodore and third-party developers? "The Soul of the New Machines" takes an in-depth look at the AGA chips and the A4000/A1200 systems that so far comprise the new line of Amigas. Finally, in "Amigas on the Block," we provide a wealth of practical information both for users who are upgrading and wish to sell their present equipment, and for those who are looking for good buys on existing systems and gear.

Whether you make the jump, stay where you are, or sit on the fence to wait and see, knowing the ins and outs of the AGA issue will help you make an informed decision.

—Daniel Sullivan ►



"The Big Decision"
p. 34

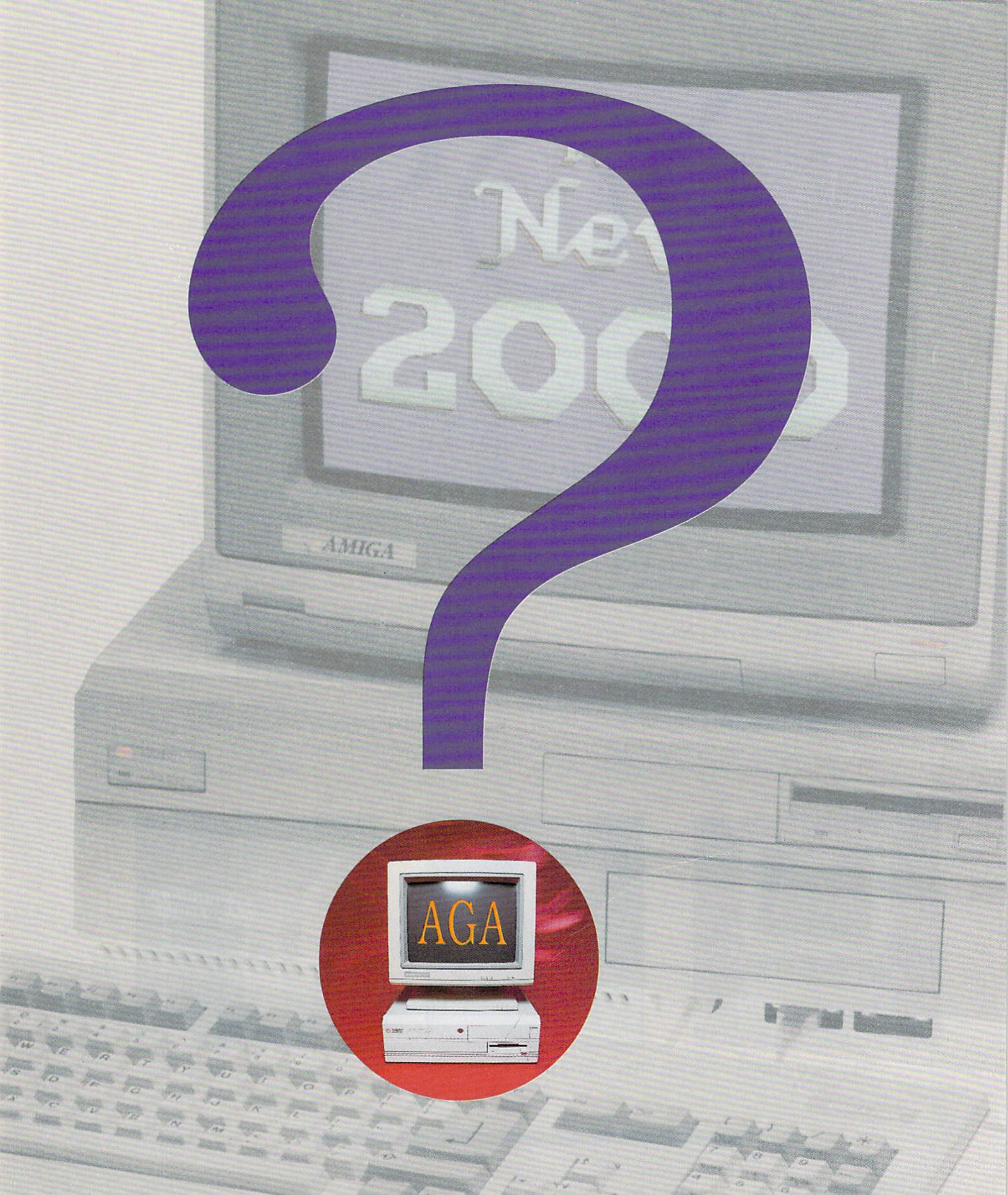


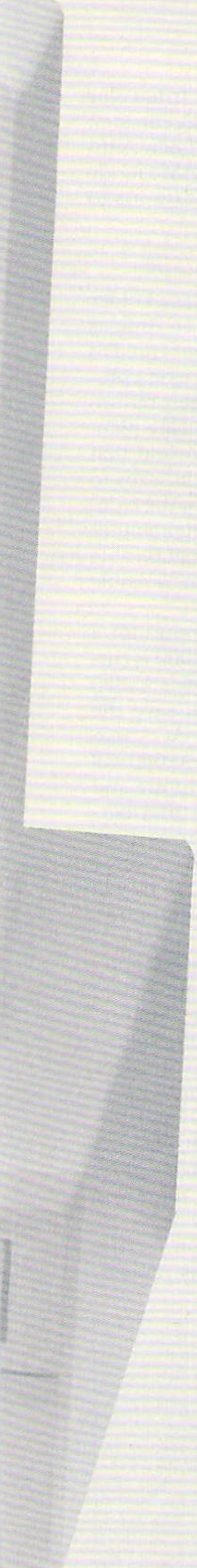
"The Soul of the New Machines"
p. 40



"Amigas on the Block"
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THE AGA ISSUE...AND YOU – 1





THE Big DECISION

The question of whether—or when—to upgrade to one of Commodore's new AGA line Amiga systems may be confusing and difficult for many users. This overview is designed to put the issue in perspective—and help you make the right decision.

BY DAVE JOHNSON

NEW COMPUTERS SEEM to make people apprehensive. Consider this: If you upgrade, will your old software run on the new machine? If you don't upgrade, will your present system become an electronic orphan? Will third-party developers abandon the older models in the name of progress? These are reasonable concerns, particularly if you're short of cash and choosing between a new computer or a cheap car.

The new Amiga line is now beginning to take shape with the A4000 and A1200. It is fairly clear that the AGA chip set will soon constitute the backbone of the product line; although the old machines will be around for quite a while, gone is the time when new software or hardware can make a really big splash without some serious support for the new color modes. Let's talk about what all this actually means to us: Must we upgrade to one of the new machines, or can we keep what we've got? In this article we'll ask a lot of questions and, if we're lucky, maybe come up with enough answers to help you make the "Big Decision" and come out on top which ever way you decide.

THE COST OF PROGRESS

The Amiga community is face to face with its first revolutionary change in hardware since the Amiga 1000 rolled out of Los Gatos in 1985. It is a change that has been met with confusion, bewilderment, and, in some circles, even anger. Some believe that Commodore has divided the Amiga platform along two incompatible hardware lines and that developers will now have to choose which segment of the market they intend to ►

PHOTOGRAPHED BY ED JUDICE

develop for. Thankfully, that really isn't true.

When you get right down to it, the Amiga product line now closely parallels another computer platform we all know—the Macintosh. Even though the Macintosh product line has been split between the old one-bit displays and Mac II high-color systems for years, most software runs on either type of machine, configuring to the available display. The Amiga, aided by Workbench 2.0's display database, permits software to conform to the computer it is installed on—taking advantage of AGA when present or working with the old chip set if need be. In other words, the presence of AGA will not weaken the developer's ability to write software for the entire Amiga market.

Nonetheless, many Amiga owners are justly concerned that they and their old chip sets may soon be left out in the cold. How worried, say, should Amiga 3000 owners be that they'll own an orphan in two years? That depends on many factors, a few of which we can reliably predict at the moment. If VGA displays and the Mac II line are any indicator, there is little doubt that software developers will quickly move toward making AGA the standard to which future software is written.

That does not mean this new software won't run on older machines, but it does mean that users without the AGA chip set will be locked out of the really hot new features that are sure to appear in these programs. While you will be able to run the AGA version of Electronic Arts' DeluxePaint IV (about to be released as of this writing) on your vintage A2000, for instance, you won't be able to paint or animate in its nearly true-color HAM8 mode. Similarly, Black Belt's Imagemaster, which has already been running on old and new Amigas alike, recognizes AGA and defaults to HAM8 mode on the A4000, while on the older Amigas it resorts to a classic HAM display.



A1000 – *AW* Premiere '85

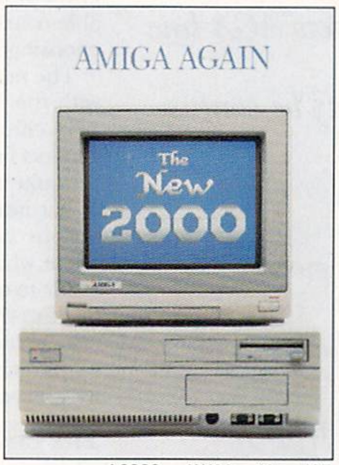
Writing on the Wall

While there is now a tremendous installed base of older Amigas, the emphasis in the future will be on Amigas with the new chip set. While not officially confirmed as of this writing, Commodore has reportedly ceased production of the A500, which had become largely redundant with the introduction of the A600. If you are planning to buy a hard drive or memory expansion that plugs into the side of your A500, you might want to consider the purchase carefully. Will you keep the computer long enough to justify the expense? Remember that the A500's bus is unique and you may not be able to sell the expansion product easily or at a reasonable profit some time down the road.

Ironically, the A2000 will probably be around for a bit yet, saved by the "Toaster factor." The A2000 is currently the only machine in which NewTek's Video Toaster will work, and that will, no doubt, save the A2000 from a quick demise. Unless a new AGA machine proves to be Toaster friendly soon, the A2000 will likely be manufactured into the foreseeable future and be well supported even longer by the Amiga aftermarket when Commodore finally does cease production. The longer Commodore and NewTek take to converge on an AGA/Toaster marriage, the more A2000s will continue to be sold, further solidifying that computer's place in the long-term market.

Obviously, though, it is in NewTek's best interest to release a version of the Toaster that can run on the A4000 and future machines. AGA support could, for instance, finally make ToasterPaint a valued feature and the Toaster a stronger product overall. Even more important, if Commodore were to unilaterally discontinue the A2000, NewTek would abruptly be left without a product to sell. Expect a new, improved Toaster soon.

What does all this mean for the A2000? Well, of all the older Amigas,



A2000 – *AW* Mar./Apr. '87

The Evolution of the Amiga: *AW's* "Amiga Time Line" traces the development of the Amiga from the introduction of the A1000 in July 1985, through the AGA models—the A4000 and A1200—at the end of 1992.



A500 – *AW* May/June '87

this is the chassis most likely to be eventually "upgradable" to AGA via some sort of motherboard surgery. This does not mean that such an upgrade will ever happen, of course. Like the A1000's latent resurrection, it will almost certainly be aftermarket forces that breathe AGA life into old Amigas—depending on what value companies perceive in offering such a product.

In any event, expansion cards for the A2000 and A3000 work just fine in the new A4000, so the A4000 should have essentially no effect on that particular market. The A4000's Zorro-3 bus is the same as that in the A3000, which proved to be highly compatible with the A2000's 16-bit Zorro-2 slot. Generally, any expansion card you use in an older Amiga will be transplantable to your A4000 when you eventually upgrade.

The 16.7-Million Color Answer

How do the Amiga's new graphics capabilities affect the swelling video display market? When CBM was slow to introduce a high-color standard for the Amiga, third-party manufacturers filled the void with their own uniquely incompatible systems: HAM-E (Black Belt), DCTV (Digital Creations), OpalVision (Centaur), Firecracker 24 (Impulse), and the granddaddy of them all, the Video Toaster. If you own one of these, does it mean you don't need an AGA machine? Absolutely not!

Because many third-party display cards don't really work within the Amiga's operating system, you generally can't get a Workbench screen or major application to run on them. Unlike the AGA chip set, none of the old display devices are universal enough to meet anything but highly specialized video and graphics needs.

Someday, that may all change with a future version of the OS. Commodore has acknowledged that it intends to develop a version of AmigaDOS with retargettable graphics (RTG). RTG gives you the capability to direct the Amiga's display to a third-party high-resolution display device just as easily as using a VGA card on a PC. So, if you decide to stick it out with your current Amiga, it may be possible in a year or two to have a true 24-bit Amiga with, say, AmigaDos 4.0 and a Firecracker.

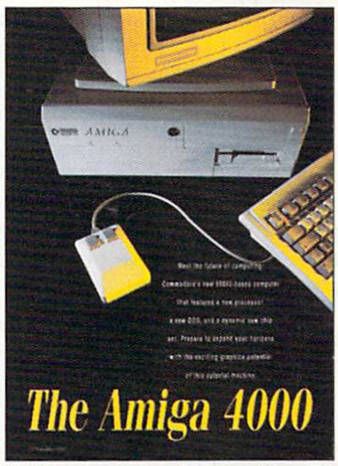
Looking at the question of display cards from another direction, what if you upgrade to an A4000? Can you still use that video card you bought only last year? The answer depends largely on which card you own. Clearly, AGA is so superior to low-end video boxes like DCTV and HAM-E that you should probably try to sell it to someone who has decided to stick it out with an old Amiga. On the other hand, 24-bit display cards significantly extend the utility of your plain-vanilla A4000. If you had a need for, say, OpalVision with an A3000, you'll still have that need with the A4000 and should keep the card. It is even possible, in the forthcoming days of RTG, that you may be able to retarget your Amiga's output to one of these cards entirely.

The bottom line is that there is still plenty of room for video display cards, with or without AGA Amigas. By their very nature, these devices perform specialized tasks for unique applications. While the Amiga's new display modes may fit the bill for the majority of us, there will always be the need for true 24-bit color, video switching, real-time image manipulation, and other capabilities you can't get in any Amiga right now.

Assessing the Benefits of AGA

In the end, the decision to upgrade or keep your existing system may not be an easy one. To make things simpler, I've analyzed the new AGA machines and determined that, for most people, there are only three principal reasons to step up to one of the new machines. Specifically, they are the new graphics modes, deinterlaced displays, and increased processing speeds.

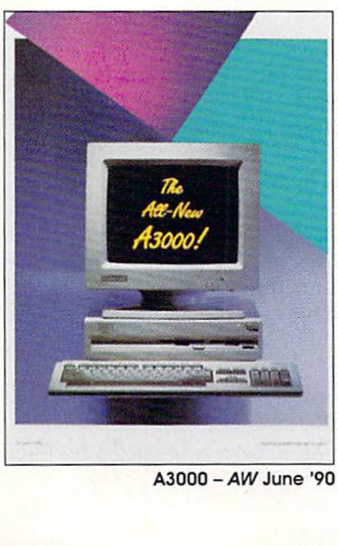
Let's start with the processor. If you still use a 68000-based machine, you'll be stepping up to a speedier CPU regardless of which AGA machine you buy. The ►



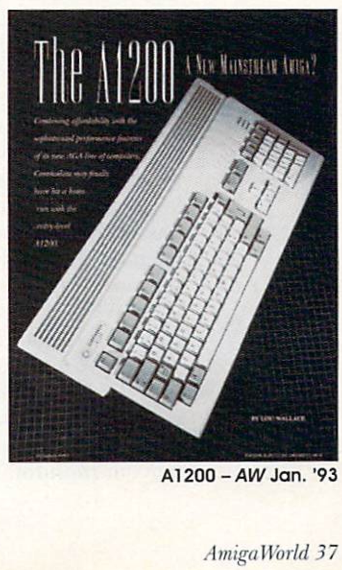
A4000 – *AW* Nov. '92



A600 – *AW* Oct. '92



A3000 – *AW* June '90



A1200 – *AW* Jan. '93

new A1200, for instance, is powered by a 68020 and is a very logical step for A500 owners. The A4000 comes with a 68040 processor.

Likewise, if you are one of the many Amiga owners who has long wanted, but never bought, a deinterlacer, AGA comes to the rescue. The new chip set employs "mode promotion," a fancy way of saying that most resolutions (from lo-res through Productivity mode) can be deinterlaced on a VGA or multisync monitor. Think of it this way: Buy an A1200 for the new colors, and get a deinterlacer for free.

If you add those two features together and throw in the new graphics modes, you may find any of the AGA machines a bargain. This leads to an obvious question, though: As nice as the new display modes are, do you really need them? This question is particularly relevant if, for instance, you have a 68040-powered A3000. With little need for a speedier processor or deinterlacing, you must decide if the new graphics modes are worth the price all by themselves. To answer that question, you have to take stock of your actual computing needs. Not everyone is a professional videographer, animator, or desktop publisher, and you may conceivably be just as well off keeping the hardware you have.

SO WHAT DO YOU DO WITH *YOUR* COMPUTER?

Statistics tell us that a majority of A500 owners primarily play games. If you own an A500 and are thinking about upgrading to the A1200 to play better games, should you? Before we answer that question, let's first recall a bit of history. For years, Amiga games were far and away superior to those produced in the MS-DOS world. The reason, of course, is that games are generally written for the lowest common denominator (LCD)—at the time, CGA and perhaps EGA. About a year ago, VGA "happened" in a really big way, and MS-DOS entertainment started looking significantly better than Amiga stuff. Today, most Amiga games are still low resolution, in 16 or so colors, while many VGA games are painstakingly crafted in 256 colors.

Thus was born the Game Gap. AGA finally offers Amiga game players the promise of high-resolution and high-color displays, but remember the LCD. There won't be a large installed base of AGA machines for quite some time, so don't expect the market to be quickly saturated with VGA-quality games. Even now, you can count on one hand all of the MS-DOS games that take advantage of Super VGA cards, and you can upgrade to one of those for well under $100. Yes, there will be AGA resolution games, but not many, at least for a while. Bottom line: Wait and see.

After games, the most common home use for many Amiga owners is word processing. Text-only word processors won't realize very much, if any, benefit from the new display modes; if text processing is your principal labor and you already use a deinterlaced display, AGA has nothing to offer you. Text processors have long been on the decline, though; most people want to integrate graphics into their documents. And while WYSIWYG (What You See Is What You Get) has become a very common catch phrase when talking about graphic word processors, until recently there was no true WYSIWYG on the Amiga. All other factors aside, you can't *get* "What You See" when what you *see* is a 4096-color image filtered down to four or eight shades on your monitor. That was unavoidable, of course, because there weren't nearly enough colors to go around, particularly at high resolution.

All that has changed now. There are already word processors available that allow you to open high-resolution, 256-color screens. If you are uncertain about the advantages of AGA and word processing, I suggest you rush to a dealer and try it out. Thanks to the speed of the new AGA chip set, displaying graphics in 16 shades of gray on a Productivity mode screen is a snappy little task. You might even try the Super72 800X600 resolution (which yields virtually a complete page on screen), although there is some flicker to deal with.

Anything you say about graphic word processing goes for page layout, multiplied tenfold. In other words, when it comes to desktop publishing, color is good; more color is better. The AGA chips couldn't have come at a more opportune time, in fact. There has been a veritable revolution in color ink-jet printer prices recently, and now you can combine WYSIWYG color on the computer screen with 300-dpi color proofs from a very low-cost printer such as the HP 500C or 550C. The new Amigas have created a formidable low-cost desktop-publishing solution that should at long last allow Amigas to hold their own against more expensive Macintosh systems.

Bottom line: If you publish, AGA is pretty close to essential. The caveat, of course, is that neither Professional Page (Gold Disk) nor PageStream (Soft-Logik) actually takes real advantage of AGA yet—so you can wait a short while before spending the money to upgrade.

Video, graphics, and animation artists will feel like kids in a candy store with the A1200 and A4000; this is AGA's "home turf." Not only is the new chip set like a gift from heaven for these chores, but also there are already a number of programs that can, or soon will, fully support it. While the Amiga's 256-color mode is actually superior to VGA (which is based on an 18-bit palette), realize that HAM8 is not true 24-bit color and therefore cannot be the ultimate solution to everyone's graphics needs. Because it is based on a HAM algorithm, HAM8 does fringe, and some professionals will still need 24-bit displays to augment AGA. For all but the most rigorous applications, though, HAM8 fringing is essentially invisible, and the new display modes can stand alone as a superior graphics tool. Bottom line: The first time you render an image in Imagine and view it in 256 colors or HAM8, you'll wonder how you ever made do with HAM. Upgrade now, if not sooner.

TIME TO DECIDE

If you're still sitting on the proverbial fence, take stock of what you use your computer for. If you think you can keep what you have for the time being, don't worry; you can always step up to an AGA machine later. But be cautious about investing in new peripherals for specialized systems like the A500 that might be difficult to sell later. It is likely, though, that for those who can afford the upgrade, one look at the new display modes will convince you that it is time to take the next step in the Amiga's evolution; we have seen the future, and the future is AGA. ■

Dave Johnson authored the book ***The Desktop Studio: Multimedia With the Amiga****, and he is a frequent contributor to Amiga publications. Write to him c/o* ***AmigaWorld****, Editorial Dept., 80 Elm St., Peterborough, NH 03458.*


Commodore
A1200
AMIGA
Commodore
4000/040
AMIGA

THE SOUL *of the* NEW MACHINES

If you do plan to upgrade to a new AGA system, know what you're buying before you plunk down your hard-earned money. Here's an in-depth look at the vital statistics of the A4000 and A1200 machines.

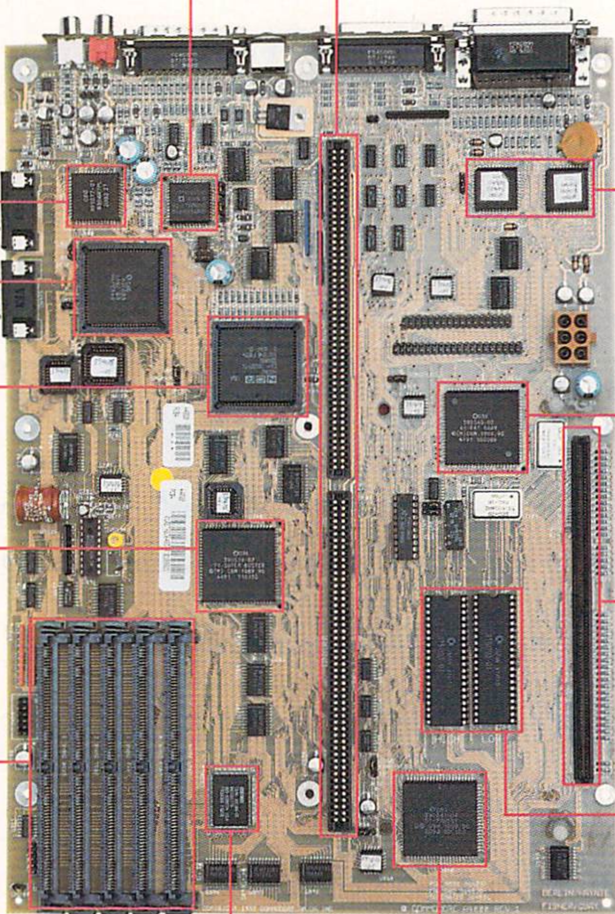
BY LOU WALLACE

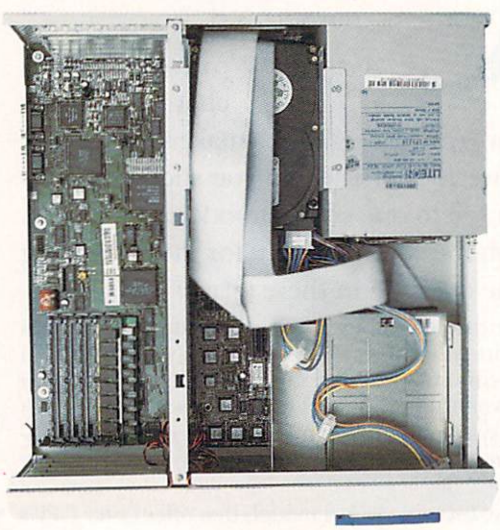
COMPUTERS change and computing needs change. So is it any wonder that Amiga users are struggling to make the "Big Decision" presented in the previous article: Do you stick with your current computer or upgrade to one of Commodore's new AGA machines? We won't rehash the issue here, but for those thinking of upgrading, consider the question in these terms:

You must first examine your existing computer, and, while noting it still does everything it ever did, determine if it offers the features you want "now." In other words, does your current computer satisfy your computing needs? If you decide that it no longer does everything you need done, the next step is even tougher. Do you upgrade your system by adding more memory, faster processors, or better graphics hardware, or should you just give it up and go for the latest and greatest?

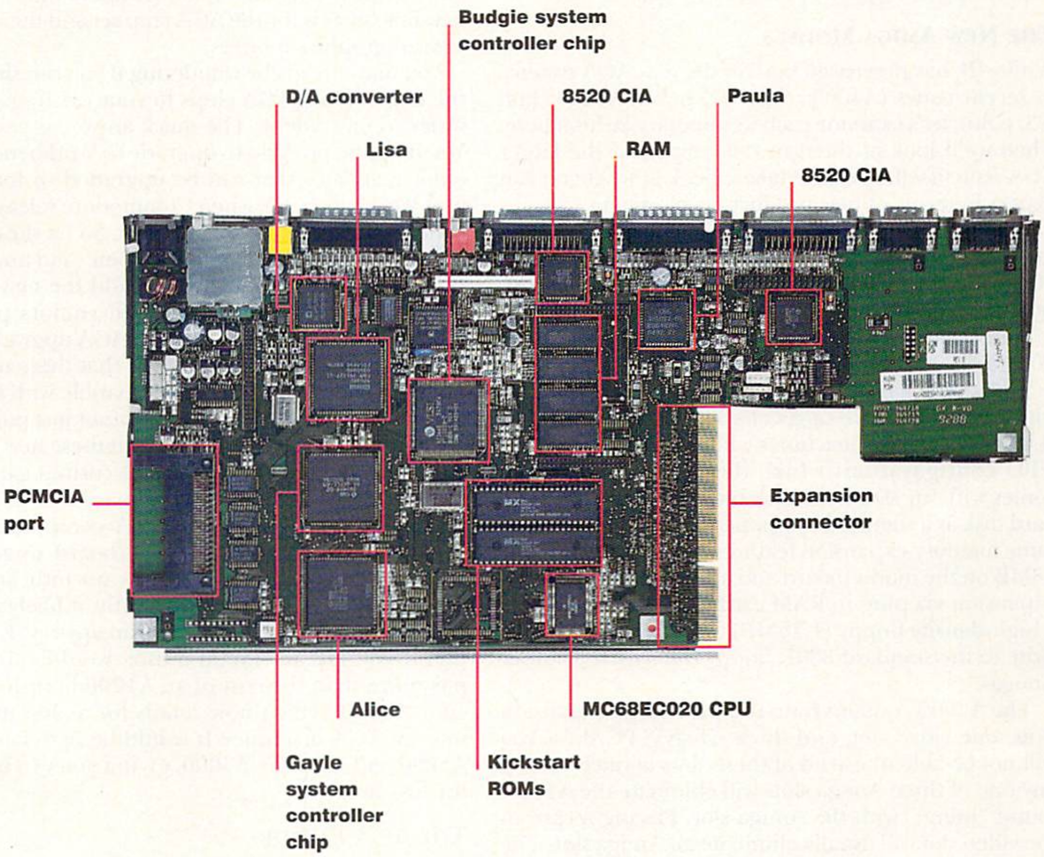
As luck would have it, there are two new Amiga models that offer faster CPUs ►

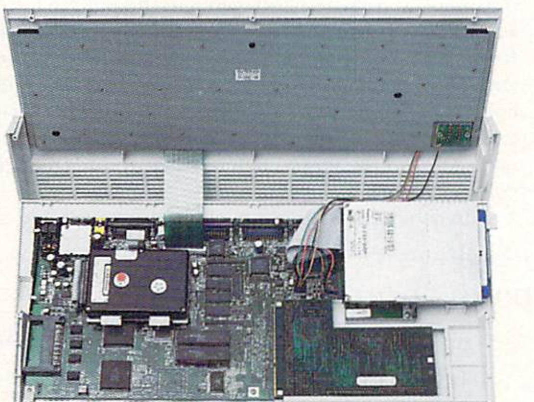
PHOTOGRAPHS BY EDWARD JUDICE



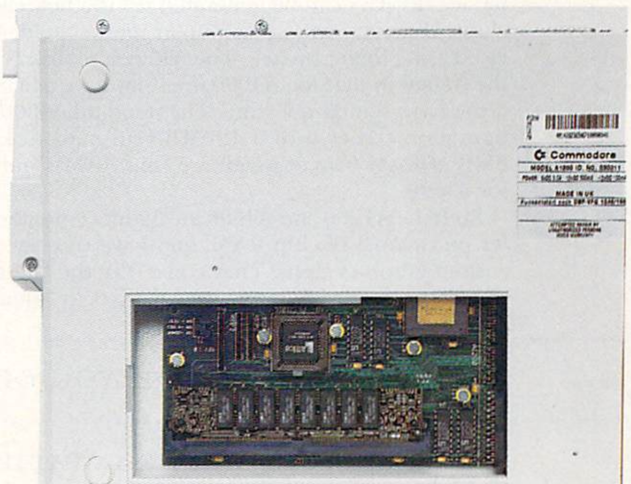


The A4000 is designed for easy access to install hard disks, RAM, and CPU cards.





Opening the A1200 shows you have room for a small internal IDE hard drive (but just barely!).



Underneath we see the A1200's expansion port.

and far better graphics than earlier Amiga models. If you want a faster processor or better graphics (or both), you would probably make a better financial choice to go with one of the new Amigas than to spend a lot of money upgrading your present system.

The New Amiga Models

While *AW* has previewed both of the new AGA systems in recent issues (A4000: Nov. '92, p. 30; A1200: Jan. '93, p.30), let's examine each in summary fashion here. Then we'll look at them in the context of the larger AGA issue itself, and also take a peek at what you can expect in terms of new product development.

The A1200 has a 14 MHz 68020 processor and an internal IDE hard-disk interface, can be expanded to 10 megabytes of RAM, and includes a PCMCIA expansion slot and a 150-pin expansion slot that can be used to add faster CPUs, math chips and more memory. With 2MB of RAM (all chip), it retails for $699.

The A4000 has no built-in CPU, but currently comes with a 25 MHz 68040 card in its 200-pin processor slot. (Later A4000-class machines will probably offer other CPU configurations.) Like the A1200, the A4000 comes with an IDE hard-disk interface, but features a hard disk as a standard component. The A4000 has the same memory-expansion features as the earlier A3000: 18MB on the motherboard and almost unlimited RAM expansion via plug-in RAM cards. The floppy drive is a high-density floppy (1.76MB) that can also read and write to the standard 880K floppy disks used by other Amigas.

The A4000 contains four 100-pin Amiga expansion slots, one video slot, and three AT-style PC slots. You will not be able to use all of these slots at once—using any one of three Amiga slots will eliminate the AT slot found "inline" with the Amiga slot. Placing a card in the video slot will usually eliminate an Amiga slot. The A4000 has internal drive bays for four 3.5-inch drives and one 5.25-inch drive.

The A4000 lacks the hardware display enhancer circuitry found on the A3000, but high-resolution non-interlace displays can be generated via the new custom chips. However, only some display modes are deinterlaced using this approach. The A4000 also differs from the A3000 in that the A4000 does not have a SCSI interface as a standard feature. The standard A4000 configuration comes with a 120MB IDE hard disk and 6MB of RAM (two of which are chip RAM), and sells for $3699.

Both the A1200 and A4000 are 32-bit computers, offer up to 2MB of chip RAM, and have the new AGA custom graphics chips. They come with the latest version of the Amiga operating system, V3.0, as a standard feature. Neither computer offers any improvement in audio features over earlier model Amigas.

Since there is a wide variety of memory, storage, and processor expansions available for the A500, A2000, and A3000 models, the main reason to upgrade to the new machines is for the AGA chip set and the vastly improved graphics it offers.

You may already be wondering if you can simply add the new OS and AGA chips to your existing Amiga in order to upgrade it. The quick answer is yes and no. Yes, it will be possible to upgrade to Workbench 3.0 on older machines that can be upgraded to (or already use) Workbench 2.0, when Commodore releases Workbench 3.0 as a stand-alone product. So far the company has not stated when that will happen. And no, for a variety of reasons you cannot just add the new chips to your existing machine (although rumors persist of third-party work on some sort of AGA upgrade option for older Amigas). Keep in mind that these new chips (Lisa and Alice) are not pin-compatible with the older chips (Denise and Agnus); you cannot just pull out the old chips and plug in the new. And these new graphics chips require other chips (such as custom gate arrays) not found on the older motherboards.

One way you could add AGA compatibility is if Commodore released a motherboard upgrade for older machines. So far there is no indication that this will happen. More importantly, it likely wouldn't be a cost-effective upgrade option anyway. For example, if you are an A3000 owner, would you want to pay more than the cost of an A1200 in order to turn your A3000 (which now retails for as low as $1400) into an AGA machine? It would be better to buy an A1200 and keep the A3000, giving you two machines for less money.

The AGA Factor

So what do these new AGA chips offer that would make you run out and spend your hard-earned money?

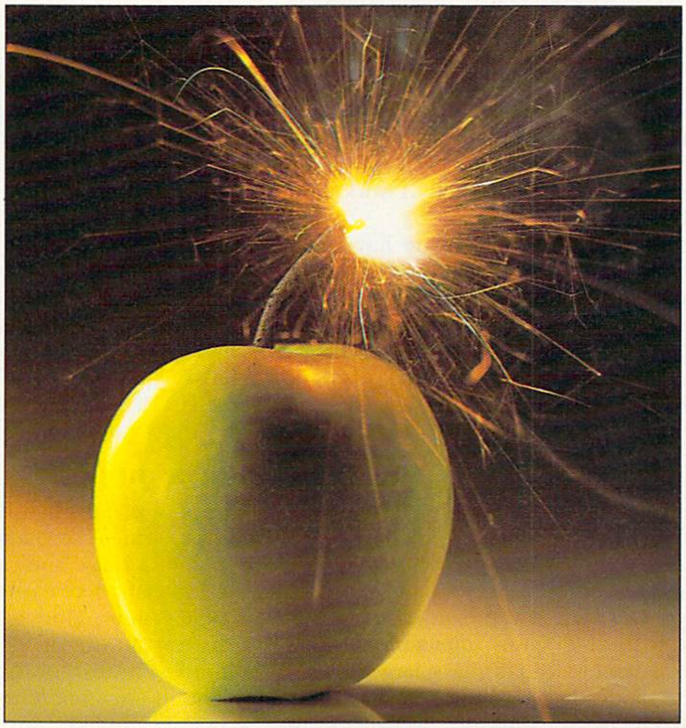
First and foremost, you get improved resolutions and enhanced color capability. The AGA chips support a 24-bit color palette, offering you any of 16.7 million (yes, million!) colors. Your screen displays can make use of one to eight bitplanes, which gives you the option of from two to 256 colors in the palette for each screen. You can select the colors for the screen palette from the 24-bit palette range available, which means the colors in the palettes can be any of the 16.7 million colors made possible by a 24-bit palette. This form of color usage is refered to as register mode, meaning each color in the screen palette corresponds to a given color register.

The other color mode is our old friend Hold-and-

"First and foremost, you get improved resolutions and enhanced color capability...The AGA chips support a 24-bit palette...[and] offer a wealth of new screen resolutions."

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The press writes:
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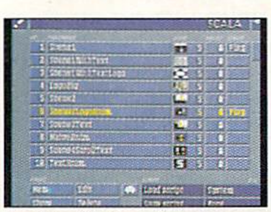
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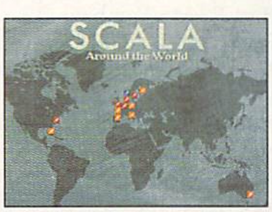
The Scala main menu.



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Why make it harder?

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Modify (HAM). AGA machines feature an eight-bit HAM mode (HAM8), which lets you use up to 256,000 colors (selected from the available 16.7 million) on screen at once. Unlike the HAM mode, which use 16 base colors, HAM8 mode offers a 64-color base, which makes it easier to create HAM8 images free of the fringe effects so common in the older HAM mode.

Most important to keep in mind is the fact that these color resolutions can be used in any screen display mode or pixel resolution. You are no longer limited to using low- resolution modes in order to get more color. A properly rendered 752X480 HAM8 image is virtually indistinguishable from a true 24-bit image.

The AGA chips offer a wealth of new screen resolutions. Besides those available with ECS and the V2.04 OS, you have horizontal resolutions up to 1280 pixels wide and vertical resolutions up to 1024 pixels high. One of my favorites is the Super72 800X600 mode, which I use for word processing as well as working in DeluxePaint AGA.

Other aspects of the graphics system have been improved. Sprites, for example, are now larger (up to 64 bits wide) and can be displayed in both low-resolution and high-resolution modes. (Previously, all sprites appeared as low-resolution images, regardless of the screen display mode.) Dual playfield mode offers two screens visible at once, with part of one screen being transparent so the other screen can be seen behind it. In AGA machines these dual playfield screens can be four bitplanes deep, meaning they can have 16 colors per playfield. This feature is handy for game developers to give their creations a smooth scrolling effect or to create complex image overlays.

The new chips' vastly improved bandwidth (a fourfold increase over the older chips) allows more colors, better resolutions, deinterlaced displays, larger sprites, and more exotic modes like four-bitplane dual playfield or HAM8. The extra bandwidth also speeds up the computer's windowing operating system. Gone are the days when using a 16-color high-resolution display would virtually lock up your A2000 or seriously bog down your A3000. In fact, you can now use 256-color Workbench displays on your A4000 and expect a performance similar to what you would expect with eight colors on older systems.

Expansion Options

There are already hardware upgrades available for these new models. For example, MicroBotics offers the MBX 1200, which is a card for the A1200 expansion slot that gives you FPU (floating point unit) and 32-bit memory expansion. The standard MBX 1200 has a 14.3 MHz M68881 math chip and comes with 1, 2, 4, or 8MB of RAM. (You have the option of adding a 25 or 50 MHz M68882 FPU instead of the 14.3 MHz M68881.) With the MBX 1200 installed, my A1200 approached about half the speed of my older A3000 in most situations, and was 2.5 to 116 times as fast as a stock A500.

So far the only announced A4000 hardware option is the A4091 SCSI-2 controller card from Commodore. Designed to give the A4000 access to the new generation of high-speed SCSI-2 devices, it also serves to silence those users who were upset with the decision to make IDE, and not SCSI, the standard interface for storage devices on the Amiga 4000 system.

You can expect that because of the features and bandwidth of the new AGA chips, the A4000-class machines will likely see some pretty impressive graphics/video accessories developed. And it's not just the chip set itself that will allow these developments. With the increased CPU power of the 68040, the 32-bit Zorro III bus, and the fact that the video slot is inline with the Zorro expansion slot (as it is in the A3000), developers will find all the horsepower they need to make their dream products become a reality.

In terms of software, it is obvious that most developers of graphics packages—paint, animation, and video tools—will add AGA support. We have already seen some announcements such as Electronic Arts' DeluxePaint IV-AGA and Digital Creations' Brilliance, and other upgrades are under way.

Many Amiga gamers are looking to the AGA machines, especially the A1200, to rejuvenate the Amiga game market. Because so many PC games are now done in VGA mode, ports to the existing Amiga (if they are done at all) tend to pale when compared to the VGA versions. With AGA that shouldn't be a problem any longer. In fact, because of the speed of the new chips, it is likely that AGA-based Amiga games will once again be the version that game companies use to "show off" their games to the public.

Under the Cover

The photos at the bottom of pp. 42–43 show the inside design of the A1200 and A4000 for user-installed expansion options. You can add floppies and hard-disk drives much more easily on the A4000 than on earlier Amiga systems. Adding RAM is easier, too, because it involves the use of SIMMs (Single In-line Memory Modules) instead of RAM chips. (SIMM RAM can be added in one- and four-MB increments, so the motherboard can hold from 4–16MB of 32-bit RAM.)

Installing an expansion card in the A1200's expansion port (on the bottom of the computer) may require a bit of wiggling to get the card in place, depending on what you install. You can mount an IDE hard disk (which may already be in place if you have purchased an A1200HD model) under the keyboard.

The photos at the top of pp. 42–43 show the new systems' motherboards, and all the new chips that make these machines so special are located and identified. Those of you who are familiar with the earlier chip sets will note that these are quite different physically.

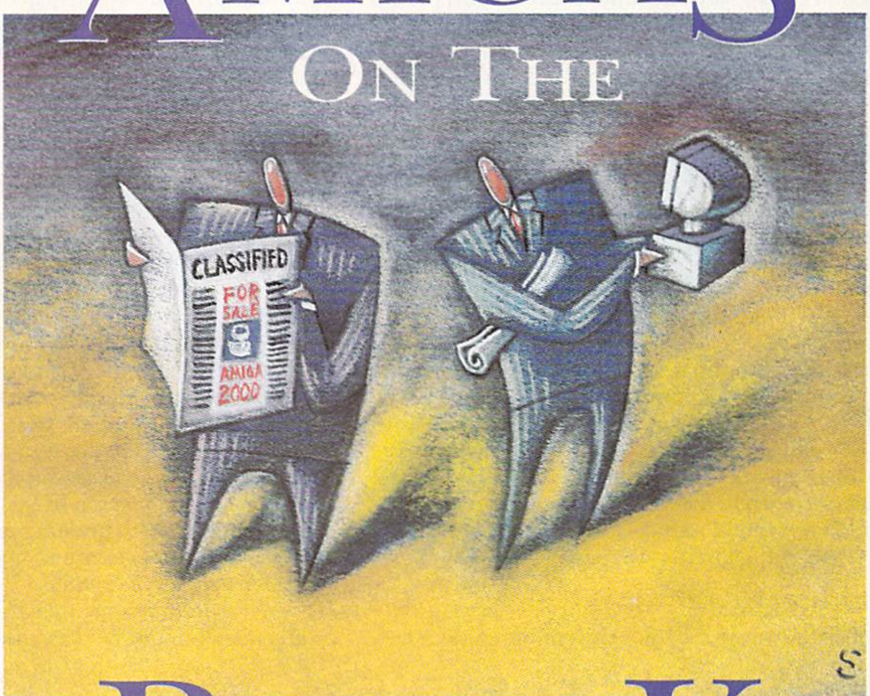
So What's a Person To Do?

The decision whether to upgrade your present system or buy one of the new machines is a complex one, which only each individual Amiga user can answer. You must factor in the performance of your existing machine, what features you need that your present computer doesn't deliver, what it would cost to bring it up to speed, and what options you have in the new systems.

By presenting the features that these new systems have to offer, this article attempts to help you understand some of the questions and choices you will have to confront. The good news is that no matter what route you take, you will still end up with one of the best computers available. ■

If you've decided to jump on the AGA bandwagon, you may be looking to sell your older Amiga. If you've decided not to jump, now is the time to get a good deal on used Amiga gear. Here's some savvy advice—for buyers and sellers—on the used-equipment market.

AMIGAS ON THE BLOCK



WHILE THE MOST rabid Amigaphiles pursue the latest and greatest (and most expensive) Amiga technology available, the rest of us can enjoy more Amiga at lower-than-ever prices by picking up bargain, pre-owned Amiga hardware. Whether you belong to the former or latter group of Amiga users, we can provide some food for thought. After reviewing the whole Amiga lineup and the considerations involving each model, we'll explore the issues buyers should consider, and then look at the sellers' options.

PAST AND PRESENT

In the beginning was the Amiga 1000. Only 150,000 A1000s were manufactured; they entered the computer marketplace in shining white armor, blitting and boing-ing graphic beach balls in a single bound. With 256K of chip memory on the motherboard, most A1000s bear an additional 256K of optional "nose-piece" RAM expansion. ►

BY JOHN FOUST

ILLUSTRATED BY RICHARD STEADHAM

Any further expansion is typically held in an out-board box, affectionately known as "slap on the side," or SOTS expansion. Because of electrical limitations, no more than two SOTS devices should be added to an A1000 (typically, these are RAM-expansion and hard-disk expanders). While internal memory expansion is also possible, such expanders hold just one or two megabytes; they were made in the days of expensive 64K and 256K RAM chips. As the oldest Amiga, the ground-breaking A1000 commands the least on the auction block.

Next came the Amiga 2000, a computer in a more conventional case with room for internal expansion cards. Often sold with a hard disk, it still offers the widest variety of expansion devices, including accelerators, memory, extra serial ports, emulators, and so on.

The Amiga 500 soon followed. Intended as an entry-level, reduced-cost machine, Commodore hoped it would be the C-64 of the late Eighties. The A500 has a memory-expansion slot on the underside and a bus connection on the side. Commodore and third parties developed external peripherals for the A500; because the connector was designed for only a single device, these devices often provide both RAM and hard-disk functions. Third-party companies have developed under-the-hood components as well.

Later, the Amiga 3000 was introduced. It featured faster processors and a different accelerator slot, but backward compatibility with some A2000 peripherals. Today, it's the best bargain around if you want a faster processor, flicker-free video, and a more sophisticated box than the A500 or A1000. Although the slim box cannot quite hold as much as an A2000, it is perfect for many people.

Only the A1200 and A4000 incorporate the newest revisions of the Amiga graphics chips. But so far the A2000 is the only Amiga directly compatible with NewTek's Video Toaster. If NewTek ever makes the Video Toaster work with the A4000, prepare for a glut of A2000 systems. In the meantime, look to the sidebar entitled "Preowned Products and Prices" for a glance at the resale Amiga hardware market.

WHAT'S THE MATTER?

While there are sure to be some driven-only-on-Sundays, mint-condition Amigas on the block, you should know of potential weak points before you buy a used system.

What might be wrong with an old Amiga? Any part of it that has been exposed to the outside world may suffer from effects of time and age. After thousands of clicks and miles of being pushed around, the mouse might creak. That's a minor problem, though; several companies offer replacement Amiga mice for around $30.

The most common Amiga problem is a defective custom chip called the 8520. Two 8520s are present in every Amiga. They interface and control the serial and parallel ports, and handle other I/O functions. If the I/O ports are acting strange, try swapping the 8520 chips. If the symptoms change, at least one 8520 is probably blown. Replacement 8520s are less than $20 each.

Similarly, the Paula chip can be damaged by static charges from fingers or joysticks poked into the mouse ports while the power was on. The serial port has another pair of sensitive chips known as the 1488 and 1489 "line drivers." These help buffer the serial circuitry from stray voltage. Your Amiga dealer probably carries all of these chips, or you can purchase them from a mail-order company.

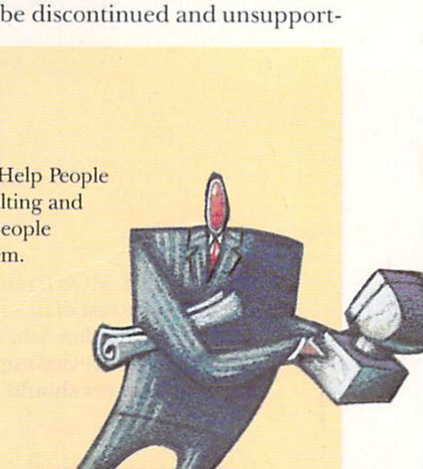
Apart from physical problems, beware of other issues, such as support and compatibility. Commodore offers ROM and software upgrades to move from AmigaDOS 1.3 to 2.0, an operation that will become increasingly important if you want to be able to use the latest software.

Also, it is difficult to use a hard-disk controller from a company that went belly-up after selling only two dozen units. Without future support or a reputation for reliability, such orphan cards are worthless. And chances are that they will not work with AmigaDOS 2.0 or 3.0. In general, you're better off buying older models made by companies that are still in business in the Amiga market. For a small sum, you might be able to buy the latest software drivers and manual for the unboxed, bare gizmo you saw on the swap table. The developer might also have a ROM upgrade that makes it more compatible with present operating systems; Commodore, for instance, offers upgrades for hard-disk controllers and accelerators.

Even if a product's manufacturer is still around, the product itself might be discontinued and unsupport-

THE GIFT OF POWER

THE FOLLOWING GROUPS accept donations of used computers. For more information about the East West Education Development Foundation, the National Cristina Foundation, and the ALS Association, see "Help Key," p. 92, Nov. '92. Computers To Help People is a nonprofit organization that offers consulting and training in adapting computers for use by people who might otherwise have trouble using them.



Computers To Help People
Attn: Carl Durocher
1221 W. Johnson St.
Madison, WI 53715
608/257-5917

East West Education Development Foundation
49 Temple Place
Boston, MA 02111
617/542-1244
617/542-3333 FAX

National Cristina Foundation
42 Hillcrest Dr.
Pelham Manor, NY 10803
800/274-7846
914/738-7494

Laura Henley
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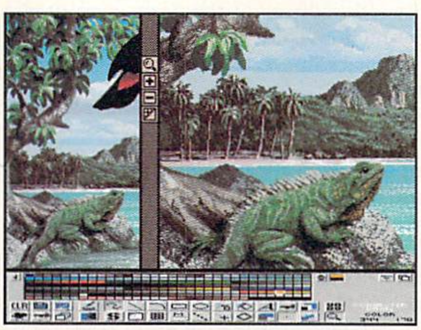
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Artwork by Jim Sachs. Created at 640x480 in 256 colors on an Amiga 4000.

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Minimum memory requirement: 1 Meg.

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Register based 2, 4, 8, 16, 32, 64EHB, 64, 128, and 256 Colors.
6 bit HAM, 8 bit HAM,
12 bit true color, 24 bit true color.

(True color modes are represented with HAM mode displays however they are maintained in full fidelity internal representations.)

DIGITAL CREATIONS

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Circle 63 on Reader Service card.

ed. For example, Great Valley Products no longer supports its Series I hard-disk adapters. Instead, it recommends that you trade up to Series II models.

The Amiga's motherboard is another consideration. There have been several revisions of the A2000's main circuit board, for instance. The latest is 6.2; older revisions, including 4.1, 4.2, and 4.3, each have their own peculiarities. Today, hardware manufacturers often guarantee their products for compatiblilty with revisions 4.5 and later, for example. If you have a 4.3 machine, you'll need to upgrade it to use the latest expansion hardware.

Commodore repair centers can resurrect older motherboards to a limited extent. A 4.3 motherboard can be converted to a 4.5, but further improvements might require a complete replacement. Swapping motherboards costs between $300 and $400, depending on your dealer's pricing and your installation requirements.

The motherboard swap may become the most routine method of "repair" for future Amigas. First-generation Amigas have many chips that use sockets to make the electrical connection to the motherboard. This makes many repairs as easy as replacing a single chip. The A600, A1200, and A4000, however, incorporate tiny surface-mounted chips that are soldered directly to the circuit board. Thus, repairs of the future are much more likely to require a relatively more costly exchange of the entire motherboard.

Pick Up The Pieces

Depending on many variables, your old computer and peripherals might be more useful as scrap and components than as work horses. For example, 8520 chips are useful as spares for any model Amiga.

Memory chips from an A1000 board can be used in some A2000 RAM boards, adding an extra megabyte or two. Be aware, though, that mixing memory cards in an accelerated system can invalidate your latest purchases. For example, adding 16-bit memory in an expansion card can slow down some 68040 cards that expect to make 32-bit address requests.

You can salvage old hard disks, too. Several manufacturers made A1000 hard-disk systems composed of a slap-on-the-side SCSI adapter and an external SCSI hard disk in a box with a fan and a power supply. Throw away the interface card for the A1000 (or turn it into a desk ornament) and keep the case, which would cost $100 or more new as part of a do-it-yourself kit.

Yesterday's 5.25-inch half-height hard disk can be replaced with an internal CD-ROM drive, shaving several hundred dollars off the price of a new, external CD-ROM package. You can also replace the old 20MB, 65-millisecond 3.5-inch hard disk with a 200MB, 15-millisecond model for about $300. Because all these devices employ the SCSI standard, you can use them on any model Amiga.

Even a supposedly "dead" hard disk is worth something, especially if you can get it for nothing. Often, the manufacturer will refurbish the drive for $75 to $150, depending on size. Most likely, the company will simply send you a new drive of the same type. Check out the advertisements in such magazines as *Computer Shopper* for companies that repair hard drives for similar prices. They often have great deals on refurbished drives.

According to one dealer, Commodore's original AmigaDOS/MS-DOS 8088-based BridgeBoard is "difficult to give away." Still slow and cantankerous by today's standards, the 80286 BridgeBoard might serve you better. A used BridgeBoard system should include the card itself, a 5.25-inch floppy drive, an Amiga disk with the Janus interconnection software, and a set of MS-DOS disks. Your dealer can assist with an upgrade of the BridgeBoard ROMs and the latest Janus software.

With 300-baud modems being historical curiosities, consider yourself lucky if you can find someone to carry yours away. The 1200-baud variety is not far from the scrap heap, either. And that $300 2400-baud modem you bought in 1988 will sell for $50 if you're lucky. For the Amiga user who has never acquired a modem, there has not been a better time to buy.

The Price is Right

"Street price" for used equipment is a hard lesson for some computer owners. The wonderfully complete Amiga 1000 system you purchased for $3000 in 1987 might fetch just $200 today. Even 1990's hot 25 MHz A3000 systems have dropped in street price to just $1000. This may be bad news for sellers, but it's good news for buyers.

When judging used equipment prices, remember that beauty is in the eye of the beholder. Determining a price doesn't require a degree in economics. If the right buyer thinks an item is worth the asking price, a sale can take place. In the final moment, price is determined by the buyer, the seller, and no one else. A typical, or street, price arises when there are enough beholders and buyers to make the market worthwhile.

The "selling price" can even be zero. Why might someone give away an Amiga? They might not know what it is. It might have been transferred as an asset to someone who didn't really want it. A snobby PC owner might dismiss a wonderful Amiga system because it is not DOS compatible.

It is possible for the value of equipment to drop to zero, then rise again later when it becomes "collectible." There are dyed-in-the-wool Commodore fanatics who collect old equipment for their computer museums. A fully-functional Sidecar for an Amiga 1000 might have no practical value, but have great historical value to the right buyer.

Set to Sell

When you're getting ready to sell an Amiga, polish it with a spray-on household cleaner in the same way you would wash and vacuum a car before selling it. Prepare a "medical history" of the devices in the system. Are they clean and well-maintained? Have they ever been repaired? Do they have any quirks? What is the future for the devices? Assemble all the pertinent records such as manuals, installation notes, and so on, that go with the hardware and software; put these things together in one place.

The medical history should lead directly to your sales pitch. Be prepared to truly sell the equipment—to convince them of all the useful things it can do and of how carefully you treated it. The sales pitch in turn leads directly to advertisement. It is good practice to add "or best offer" to the price in any advertisement. It should result in more inquiries, giving you a chance to exercise your sales pitch.

If you have a modem, post an electronic version of your ad to the classifieds section of local electronic bulletin board systems. If you subscribe to an inter- ►

national computer network such as CompuServe, post your notice in the Amiga forums.

In printed form, you can advertise in computer user group newsletters. While an Amiga-specific newsletter is probably the best place to advertise Amiga equipment, don't forget local MS-DOS and Mac newsletters and bulletin boards, too.

Many Amiga dealers sell equipment on consignment, meaning they will display your goods in their store for a small fee. Such shops usually request an amount equal to ten percent of the sales price. Consignment stores can suggest a price for the goods. Their price might differ from your expectations, but keep in mind they are more experienced than you about the true street value of used Amiga equipment. They have little reason to set a price that is too low or too high; after all, a low price means they'd get less commission than they possibly could, and an inflated price means you might never find a buyer.

If you don't have a local Amiga dealer, consider listing your items with an organization such as The National Amiga Exchange, a consignment service of DC Computers in Chantilly, Virginia. To receive its listing, you need a fax machine with "polling" abilities. Dial 703/620-9499 and you will receive a half-dozen pages listing Amiga software, hardware, and related items. The voice number is 703/222-8799.

Give and Take

If your fond memories of that old Amiga 1000 remain strong, and you are saddened by how little you can get for it, consider donating it to a worthy cause. Do you know a child who would love a computer to call her own? Is there someone you believe could uncover newfound creativity if only he knew about DeluxePaint?

Donating your machine to a neighborhood center or national group (such as those listed in the sidebar "The Gift of Power") can bring a tax deduction, too. Keep in mind, though, that most charitable organizations have little time to devote to computer equipment that is not in working condition. If the machine needs repair, have it done before you donate the system.

In fact, because the Amiga is not as well-known as other computers, you might want to make a few extra preparations before you donate. Your medical history of the system might include extra notes to point out the Amiga's speech and graphics abilities.

Endless swapping of disks is a hassle for anyone, regardless of ability. It might be impossible for someone of limited dexterity. If you can, prepare bootable floppies for the software you intend to include in the system. Or consider donating the hard disk, too. Even an old, slow 20MB hard disk is valuable to someone who's never had a computer before.

To make the Amiga more useful to some people, Black Belt Systems offers the Jakeboard, a freely-distributable software alternative to the traditional keyboard. It works with most Amiga applications. When the mouse (or alternative pointing device) is moved to the lower half of the screen, a graphical keyboard appears. Click on a key and it is automatically sent to the application. The Jakeboard also holds down the Shift and Control keys until a second key is pressed, making it possible to reach all key combinations. Any Amiga user might use it in a pinch if their keyboard is broken.

AGA wasn't even a twinkle in Commodore's eye when the phrase "Only Amiga Makes It Happen" was coined. Just because there's a new generation of Amigas available does not mean the earlier models should be discounted. Whether you're trading up, getting in cheap, or adding to your Amiga collection, remember that all models are powerful tools. ■

*John Foust has been actively involved in the Amiga market since the A1000 made its debut in 1985. He's written for several computer publications and is president of Syndesis Corporation. Write to him c/o **AmigaWorld** Editorial, 80 Elm St., Peterborough, NH 03458.*

Preowned Products and Prices

Model #	Features and flaws	Street value
AMIGA COMPUTERS:		
A1000	68000 processor; old, slow; little hope for future expansion; long discontinued	$100 for stock machine; $150–$200 with 1.5MB RAM
A500	68000 processor standard; limited expansion; recently discontinued	$300 for new bare system $150–$250 used
A2000	68000 processor standard; highly expandable; most popular model	$790 new bare machine; $500–$600 used bare machine; $800–$900 with 50MB hard disk, 4MB RAM
A3000	68030 standard; MMU, FPU; new; deinterlaced video; 16 & 25 MHz models	$1000–$1300
COMMODORE PERIPHERALS:		
Hard-disk adapters—		
A2090	No autoboot; ST-506 and SCSI	Free or cheap
A2090A	Autoboot; ST-506, SCSI, but not best	Free or cheap
A2091	Commodore's latest; autoboot SCSI	$40–$80
Accelerators—		
A2620	68020, MMU, FPU	$200–$300
A2630	68030, MMU, FPU, and room for RAM	$500 max
BridgeBoards—		
8088	Very slow	Free or cheap
80286	Faster PC	$75–$150
80386SX	Better still	$300–$500



Music of the Spheres



If you can hum a tune the same way twice, you can write a song on the Amiga. You don't need fancy equipment, just a couple pieces of software, a few ideas, and the "circle of fifths."

By Gene Hamm

WE'VE ALL read technical articles about sound sampling and MIDI products. This isn't one of them. This one's for people who want to create music on the Amiga, but know little about music composition. If you can hum a tune the same way twice, this article can help you recreate it on your computer.

You don't need a complete MIDI studio—you don't even need to know what MIDI is. What you do need is a piece of music software that provides an on-screen keyboard (Dr. T's Tiger Cub, The Blue Ribbon SoundWorks' SuperJam!, and Electronic Arts' Deluxe Music all do; such programs as Dr. T's BoomBox do not). I also recommend ►

ILLUSTRATED BY ROBERT PIZZO

you use a paint or draw program for this project. Cassette decks and electronic keyboards are optional extras. (I have a Tascam Porta One four-track cassette deck connected to my Amiga. I write all the complicated guitar riffs and orchestral maneuvers on the Amiga and dump them to one track. The easier parts I play on my Casio keyboards and leave the remaining tracks free for lead vocals and harmonies. So far I haven't composed anything complicated enough for me to learn MIDI, but the day is coming.)

It helps to know the names of the notes on the piano keyboard, because you enter notes in most music programs by clicking on a graphic representation of a keyboard. (Of course you can also enter notes via a real music keyboard connected to your Amiga.) So here's a short course:

Looking at the keyboard, you will notice the black keys are clumped in twos and threes. Pick out the group of two black keys closest to the center of the keyboard. Look at the left black key. The first white key to the left of it is C. The white keys are natural notes. The black keys are sharps or flats. Moving up the scale to the right, it goes C, D flat, D, E flat, E, F, G flat, G, A flat, A, B flat, B, and C. That scale repeats all over the keyboard.

Will It Go Round in Circles?

The most useful musical tool I have come across is the "circle of fifths." It is the musical equivalent of the Color Wheel in art. With the circle of fifths, you can find all the notes in a chord, other chords in a progression, or transpose melody and chords all over the scale. It is divided up into 12 slices of pie, each slice the name of chord. The outside ring comprises all major chords. The inner ring is made up of minor chords.

The circle of fifths is buried inside most music programs. That is why a tune can be automatically transposed to any key. I've unearthed it so you can understand how it works.

To get the most use out of the circle of fifths, use your paint or draw program to graph some of the common chords (Electronic Arts' DeluxePaint IV). Once you build and save your circle of fifths chord chart, you can display it on one screen while running your music program on another, flipping back and forth between windows when you need to refer to it.

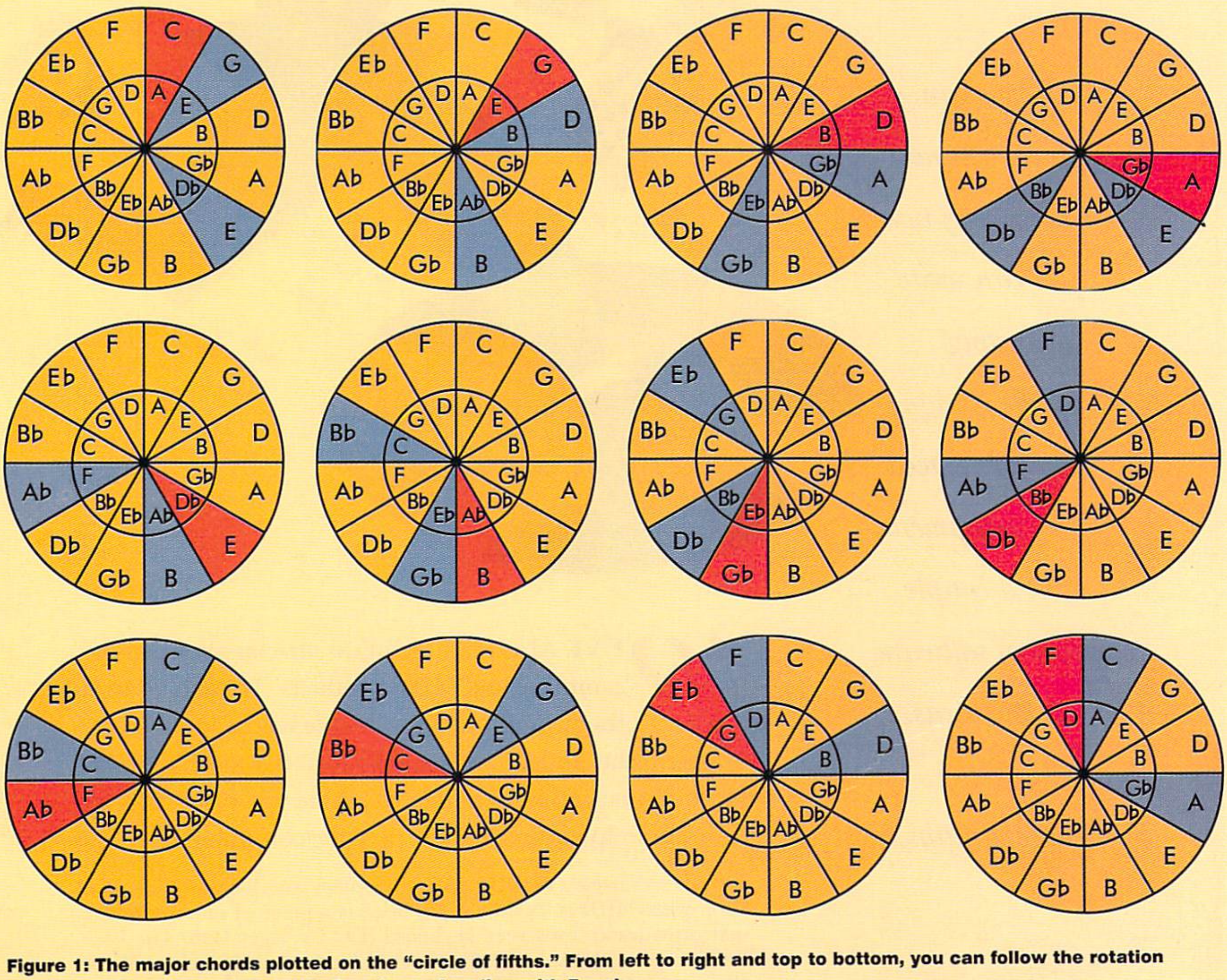


Figure 1: The major chords plotted on the "circle of fifths." From left to right and top to bottom, you can follow the rotation through the scale, beginning with C major and ending with F major.

In DeluxePaint IV, turn on Perspective so you see the cross hair in the center of the screen. Make a small circle emanating from the center, then a bigger circle, and another one still larger. Turn off Perspective and select the Symmetry tool. Set Symmetry to 12 and draw a line from the center point to the edge of the circle. It should divide the circle into 12 segments. Make sure to keep the circle roomy enough so that you can type in the names of the keys in text mode. Save it as a brush.

Stamp the brush 12 times on the screen and save the screen as Blueprint. Then number the circles 1 through 12.

Responsive Chords

To make a pie chart for a major chord, find C, G, and E, and color them in on the first circle of fifths. Make C red, as it is the root note of the chord, and color the other two notes pink. On the second circle of fifths, offset your coloring one slice so G is the red root note and D and B are the pink notes. On each successive circle keep moving over one slice, until you have the major chord colored in on all 12 circles. It should come out looking like the sweep of hands on a musical clock (see Figure 1). Save this screen as "Major Chord."

Notice that on the major chord C and G are clumped together and E is three slices to the right of G. A minor chord is a mirror image of the major chord, with E flat three slices to the left of C (see Figure 2, top left). Call up the Blueprint screen and run through the same coloring procedure on all 12 circles. Usually, minor chords are transitions in chord progressions from one major chord to another, but songs can be made up solely of minor chords for a distinct sound, such as in reggae.

Seventh chords give a slightly more bluesey sound. Graphically on the circle of fifths, a seventh chord looks like the major chord with an added fourth note. The fourth note, E flat, is three slices left of C on the first circle (see Figure 2, top right). You can make a chart for all the seventh chords.

Minor sevenths are used for syrupy, soft jazz; they have a light, slightly wistful sound. The Beach Boys used a lot of minor sevenths. The fourth note is part of another chord, so it makes the chord a little indecisive, soft-edged, and nebulous, tugging between two chords. It is not a definite statement like a major chord. The painting equivalent would be the difference between a hard-edged primary color and a soft-edged tertiary color. As depicted in Figure 2, center left, minor seventh is a minor chord, with the fourth note, B flat, two slices left of C on the first circle.

A C major seventh chord (Figure 2, center right) is made up of C, G, E, and B, and is what most Bossa Nova songs consist of. Try it all over the pie chart.

C major sixth is the reverse of the minor seventh (Figure 2, bottom left). It consists of C, G, A, and E. It's another chord that pops up in Beach Boys songs, especially the ones about tropical climates. Dial it around the circle and see how it sounds.

As you can see in Figure 2, bottom right, a minor sixth looks like a mirror image of a seventh. In C, it consists of C, G, B flat, and A. It has a melancholy sound.

The diatonic scale is the one used in most rock-and-roll songs. If you know how to sing "Do Re Me Fa So La Ti Do," you know how to sing the diatonic scale. It consists of seven notes that can start on any root note. With a root note of C, it comprises all the white keys. This means that in just about any rock-and-roll tune, you have a one-in-seven chance of hitting the right note (pretty good odds). If you use the circle of fifths to find the notes in the diatonic scale, you must decode it slightly because each slice of pie is five notes above or below the one next to it (see Figure 3, top). Thus, if the C is number one,

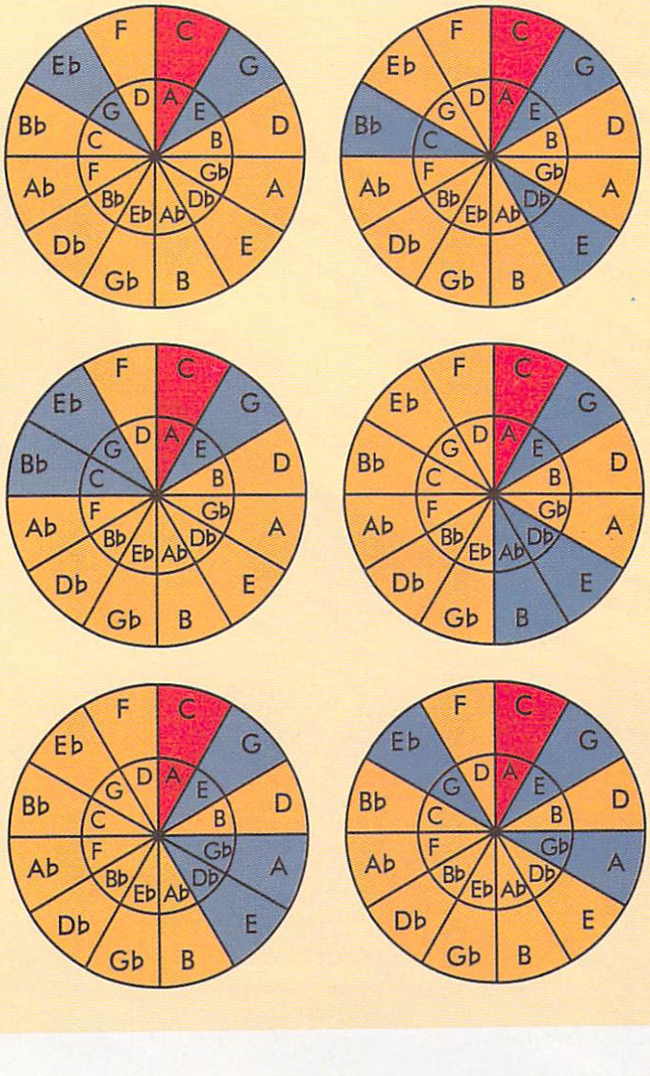


Figure 2.
Top, left to right:
a C minor chord,
a C seventh chord;
center, left to right:
a C minor seventh,
a C major seventh;
bottom, left to right:
a C major sixth, and
a C minor sixth.

you must start one slice left of C, and the numbering—going clockwise—is 4, 1, 5, 2, 6, 3, and 7.

The chromatic scale is all 12 notes: C, D flat, D, E flat, E, F, G flat, G, A flat, A, B flat, B, and C again. On the circle of fifths, starting with C, the numbering is 1, 8, 3, 10, 5, 12, 7, 2, 9, 4, 11, 6, and 1 again. You can see this depicted in Figure 3, bottom.

Bites of the Pie

A simple rock-chord progression, counted out in beats would be C-2-3-4, C-2-3-4, F-2-3-4, F-2-3-4, G-2-3-4, F-2-3-4, C-2-3-4, C-2-3-4, and repeat. If you look on the circle of fifths, those chords are clustered together so you have used only a quarter of the whole pie. None of my songs have ever gotten close to using even half of the chords in the pie. At its most basic, my first three-chord rock-and-roll song was just the standard blues progression. You can get a lot of mileage out of those three chords; some rockers have made a whole career from them! Most music clusters around and returns to one chord, which makes locating all your notes that much easier. I think only the most progressive, atonal jazz would use every chord.

When I think of a tune, I try to make the first note start on a key I am familiar with. In most rock and roll, every four beats is a measure, and most chord changes are on the first beat of the measure. I count out my tune in beats to see where chord changes are. Figuring out the name of the notes in each chord change makes it simpler to narrow down the names of the notes between the chord changes. I am an animator and relate this pattern to the frames of an animation sequence: I see the first note in each chord change representing both extremes, or key frames, and the other notes as in-betweens. The chord-change notes are the most important, because they give shape to the song. The other notes are secondary details.

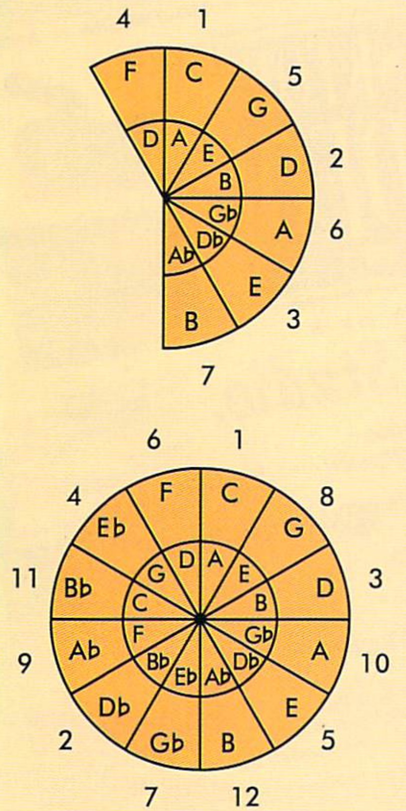


Figure 3. top: the diatonic scale; bottom: the chromatic scale.

To find the name of the chord, I go to the circle of fifths. My first guess is that the name of the chord is the name of the note, so I try that major chord on the outer wheel. If that doesn't quite sound right, I then try the minor chord of that major, which lies on the inner wheel. Nine times out ten, you will find it is either the major or the minor. If that does not work, then go around the pie chart and try every major chord that includes your note. If that doesn't work, do the same with every minor chord. It is detective work, but the circle of fifths gives you a good map to save you legwork.

Going back to our rock-and-roll song, I usually start with a repetitive guitar riff before I add the melody on top. (I grew up in an era where we all hummed the guitar riff instead of the melody.) We know the first chord is C and that the first note of the riff is C. To simplify things, I give all the notes equal value in time. (Later on, in the clean-up stage, I will determine whether to add eighth notes, sixteenth notes, triplets, and so on; now such things would just add confusing detail.) For each subsequent note in the riff, just move up or down the keyboard to see how far it is from the last note. Once you know all the notes in your riff, mark them off on your circle of fifths.

The next chord change is to F. The guitar riff repeats, but now the first note starts on F. To find the other notes in the riff on your circle of fifths, rotate counter-clockwise one slice of pie so that the root note starts on F instead of C. All the other notes will fall into place. For every other chord change, just dial in the root note.

Let's go back and take a look at the beginning of the song that starts with the C chord. Whatever melody you come up with will start with C or one of the other notes in the C chord, namely E or G. You can find the other notes in the melody the same way you found the notes in the riff.

Harmonizing

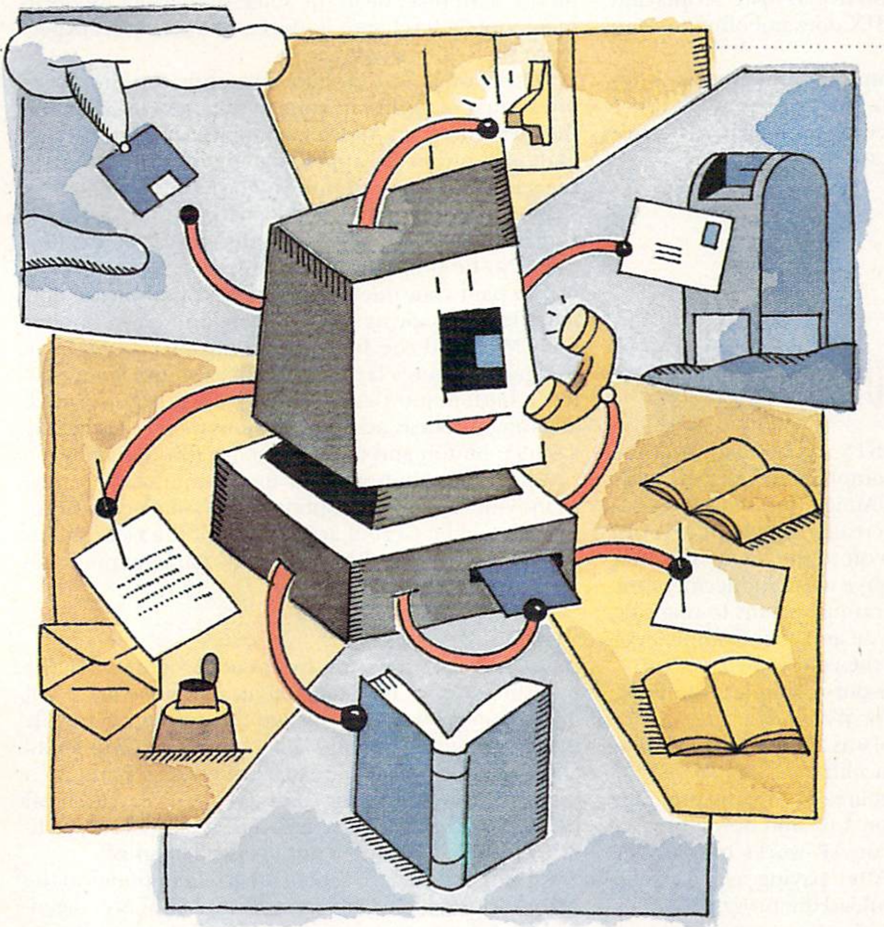
To make harmony for your melody, look back to the diatonic scale (remember "Do Re Me Fa So La Ti Do?"). Consider each note in your melody separately. To make two-part harmony with the first note, think of that note as Do. Start there, move up the scale to Me, and sing it on top of Do. You now have two-part harmony with the first note. Do the same separately with all the notes in your melody. For three-part harmony add So to Do and Me.

As you play with the circle of fifths, you will see some of the same chord progressions crop up in your songs again and again. You may start out writing tunes and then looking for chords. Later on you may play chord progressions until they suggest a tune. Perhaps you will reach a point where the common chord progressions seem like cliches. If this happens, you can note the mathematical patterns your chords make on the circle of fifths and, using a purely intellectual approach, try different mathematical patterns that have their own logic. Alternately, you could take a John Cage random approach, print out the circle of fifths, use it as a dart board, and compose by recording your hits!

I've written over 200 songs since I got out of high school. Until I produced them with the Amiga, they never sounded the same way recorded as they did in my head. Now I have fun recording them, reliving my adolescence, and observing the way the Amiga has affected my music. Because of the Amiga's vast sound possibilities, my music has developed and expanded from simple songs to instrumentals and background music for animation, and has grown in texture and complexity. ■

Gene Hamm is an amateur musician and a professional animator. In addition to working for TecMagik, Colossal Pictures, and ***The Gumby Show****, he has produced a videotape entitled* ***Amiga Animation: Hollywood Style****.*

UP-FRONT SAVINGS *On Line*



Front-end terminal programs can save network users time and money by automating communications tasks and cutting down the time you spend on line.

You think that just because you recently equipped your Amiga with a snazzy new 9600-baud modem, you can scurry about the BBSs and nets at a dizzying pace—saving all kinds of time and money in the process? Think again.

Sure, uploads and downloads now move with lightning speed, but not much else has changed on the networks. If anything, checking your E-mail and greeting others on-line seems slower, not faster, and browsing the ever-growing number of information databases gets more confusing and time-consuming all the time. The usual system delays during peak hours compound the situation. And, worse yet, some nets have the nerve to charge extra for 9600-baud transmissions!

But don't despair yet. Before you chuck your on-line pleasures and apply as just another social misfit on a weekday talk show, think about upgrading your telecommunications software first.

Easy Living On Line

Of course, a liberal amount of scripts, macros, and ARexx code can make all but the most awkward communications packages run smoother and faster—but few Amiga users have the time, inclination, or knowledge to write them. Far easier solutions come in the form of Amiga front-end terminals for ►

BY TIM WALSH

ILLUSTRATED BY ROBIN JAREAUX

the major commercial telecommunications networks.

Aladdin (GEnie), AutoPilot (CompuServe), and PortalX (Portal) are three such programs designed to make your on-line time more effective and reduce the size of your network bill. (Whether it's the lack of an additional charge for 9600-baud transmissions or its population of technically savvy users who live to write scripts and discuss ARexx *ad nauseum*, BIX does not offer an Amiga-compatible front-end.)

By automating many common communications operations, each makes the on-line process much faster and generally easier. All three are particularly effective if you're using a 9600-baud modem, too.

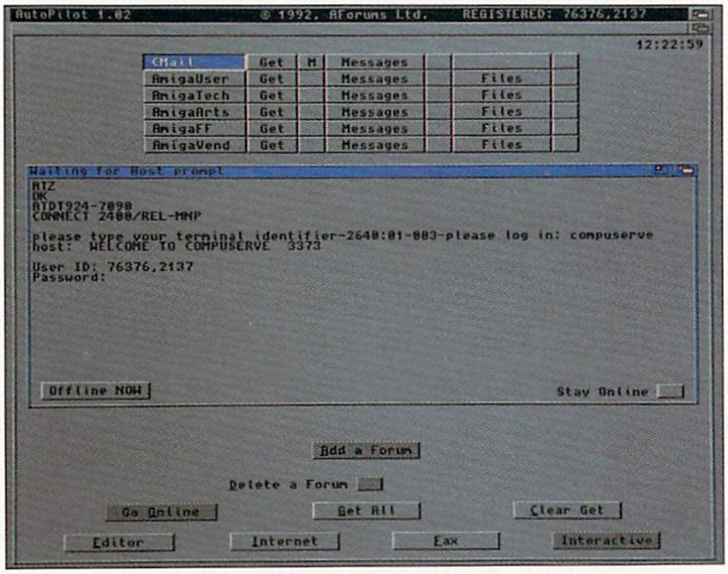
AutoPilot / CompuServe



MANY AMIGA ENTHUSIASTS wax nostalgic over the good old days of Whap!, CompuServe's slightly awkward, ungainly, but beloved Amiga front-end. According to Steve Ahlstrom, the creator of Whap!, the old pre-2.0 warhorse will gallop off to the binary dust bin later in 1993. This should serve as an inducement for holdouts with outdated operating systems to upgrade to 2.0 or higher; otherwise, you and your CompuServe (CIS) account will be out in the cold someday soon.

The reason for the phase-out is simple: AutoPilot, the acclaimed replacement for Whap!, is a better, more professional program. Whap! was already long overdue for an overhaul, not just a facelift.

Found in the AmigaVendor area of CIS, the program has been enhanced to version 1.02 and now attracts a loyal following. AutoPilot, or AP, works only under AmigaDOS 2.0 or higher. After paying a visit to the AmigaVendor forum to download the program and its documentation, you're almost ready to get under way.



AutoPilot options are laid out in a clean, button-style format.

I say "almost" because in my haste to install and begin using AP, and spoiled by a new generation of Amiga software with automated installation, I failed to recognize the seemingly arcane and dated necessity of manually adding an ASSIGN statement to the user-startup and taking note of which directory AP resides within on the hard disk. Read the somewhat elaborate documentation beforehand, however, and you won't experience such difficulties.

Once installed, AutoPilot demands the time-honored ritual of typing in your local access numbers on the nicely detailed AP screen, followed by your user ID and password in the appropriate requesters, and then the specifying of baud rate and other minor details.

After you log on to CIS for the first time using AP, E-mail is sent to AForums Ltd., the creators of the program, so be prepared to get billed for $69.95. Once you've paid your dues, a whole host of otherwise dormant features spring to life. There are screen options for CMail and the four Amiga forums: AmigaUser, AmigaArts, AmigaTech, and AmigaVendor. Simply select a button and the option next to it is performed. You can, of course, add more forums merely by clicking a screen button and typing in other forum names.

A handful of buttons near the bottom of the screen round out the primary options. Go Online calls CompuServe, while Get All activates all of the Get options for the above areas. Clear All, as its name implies, deactivates all of the Get buttons.

AutoPilot in Action

AutoPilot, similar to the front-end programs for the other netorks we'll be looking at, offers the luxury of making one menu selection and then sitting back while the computer logs on and collects messages from Mail and the Amiga forums; reads new messages and then transfers and installs any messages you've written off line; uploads, downloads, and makes a list of Amiga library catalogs; and then automatically logs off.

AP automates more E-mail messaging options in the Amiga forums than anyone will probably ever need. Message sections in the various windows for each forum are initially ghosted, or inactive, to show that you cannot use them until you pay a visit to the forum and note the status changes.

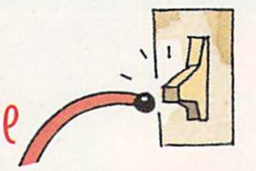
Having plowed this far along, there's little danger things will go awry as you proceed further. With a name like AutoPilot, it's not by chance that buttons next to each forum on the screen allow fledgling novices to become CIS power users in rapid fashion.

Among the finer points about AP worth mentioning is an option called Link Speed, which is basic in design, but quite advanced in overall execution. It's used to set the baud rate between your modem and your computer. While this may sound simple enough, consider that this speed may differ from the connect rate between your modem and CIS. High-speed modems that support MNP or v.42bis compression send data to the computer at a faster, compressed rate. Link Speed then performs a transparent decompression on the fly. Displaying more data than is actually arriving may necessitate that you set Link Speed to a higher rate than the connect speed to prevent the loss of data.

It would be an understatement to say AutoPilot is a worthy successor to Whap!. AP is genuinely a better program and a strong argument for all CIS users to up-

grade their operating systems if they haven't already done so. If for no other reason, you will enjoy using this program just for the amazing speed at which it transports you about the CIS system—retrieving information and recording every move for leisurely off-line browsing. AP is swift and well documented (and it even sports a good sense of humor with its slightly-less-than-complimentary reference to the network as "CI$"—right in plain view for the whole world to see!).

Aladdin / GEnie



JUST AS WITH AutoPilot for CIS, Amiga users of GEnie should make getting a copy of Aladdin a top priority. An entire forum on GEnie, called the Aladdin Support RoundTable, is dedicated to supporting this elaborate freeware, which has gone through several updates since its initial release by Timothy Purves in 1991.

Beyond saving time and automating E-mail functions, Aladdin provides automated access to all the public RoundTables, or areas, on GEnie. Three other major segments and a host of smaller features round out the program. These include communication facilities, terminal emulation functions, and the Aladdin Script Language.

Getting started with Aladdin involves logging on with a terminal program and retrieving ALADV1.5.RUN, a 140K self-extracting executable file from the Aladdin Support RoundTable. Like AutoPilot, ALADV1.5 requires AmigaDOS 2.0 or higher; without it, the program won't even decompress onto your hard disk.

With Aladdin decompressed and in place in minutes, clicking on the various menus positioned about the nicely detailed screen and typing in the required information gets the wheels in motion. There's no waiting for activation from GEnie with this program. Enter your sign-on information, modem configuration, and the names of the RoundTables you're interested in attending, and then log on to test the setup. If all goes according to plan, you're logged on, information is retrieved, and you're logged off.

FAST-PACED ACTION

Once you read up on the documentation and get Aladdin customized for your system, the fun really starts. To fully appreciate Aladdin's functionality, an understanding of GEnie's hierarchical configuration is in order. As mentioned earlier, GEnie is divided into RoundTables, each of which contains Bulletin Boards. These are further subdivided into categories, each of which includes a number of given topics.

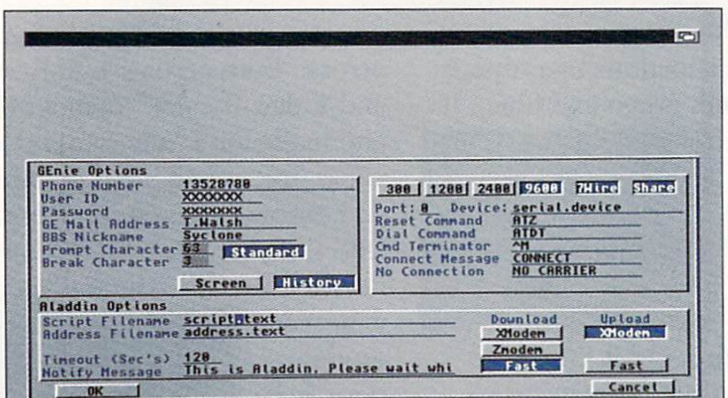
For every message Aladdin retrieves from a particular Bulletin Board, it will display the appropriate category corresponding to that message. Because each category is further subdivided into topics, Aladdin will also search for user-specified topics—all in a fraction of the time needed to perform a manual search. If there is a downside to this high-speed action, it's only that because everything happens so quickly, you have very little time to acknowledge the activity—much less verify that each category you desired was checked for its contents. But once you get the hang of it, you will learn to appreciate all that time-saving speed of operation.

Further enhancing its functionality, Aladdin allows the addition of new topics in any category. Simply use the built-in editor to type in a message, let Aladdin post it on the Bulletin Board area of the RoundTable, and you're finished. Aladdin then retrieves any responses to the inquiry the next time you log on.

Aladdin handles the Software Libraries on GEnie in much the same manner. List the names of the desired RoundTables and it scans for new uploads in each specified area. You can then examine these off line, and mark them for retrieval. Of course, when you log back on, Aladdin downloads them for you automatically.

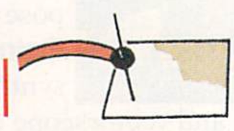
If you are so inclined, Aladdin also sports an RTC command that will take you to the RoundTable Real Time Conference area, a virtual trip to Purgatory for hardcore lurkers who strive to maintain a low profile. With RTC, Aladdin will first check for E-mail—collecting and saving it for you—and then continue on its happy tour to join you with other social butterflies in the RTC area.

What *don't* I like about Aladdin? It bothers me that while you can select between interlaced and noninterlaced screen displays, there's no provision to use Aladdin outside its custom screen. Maybe it's the slick interface design and its snazzy embossed requesters that make it cry out for use on the Workbench screen. I expect to see that problem addressed in new releases.



Aladdin installs easily and gets you on line quickly.

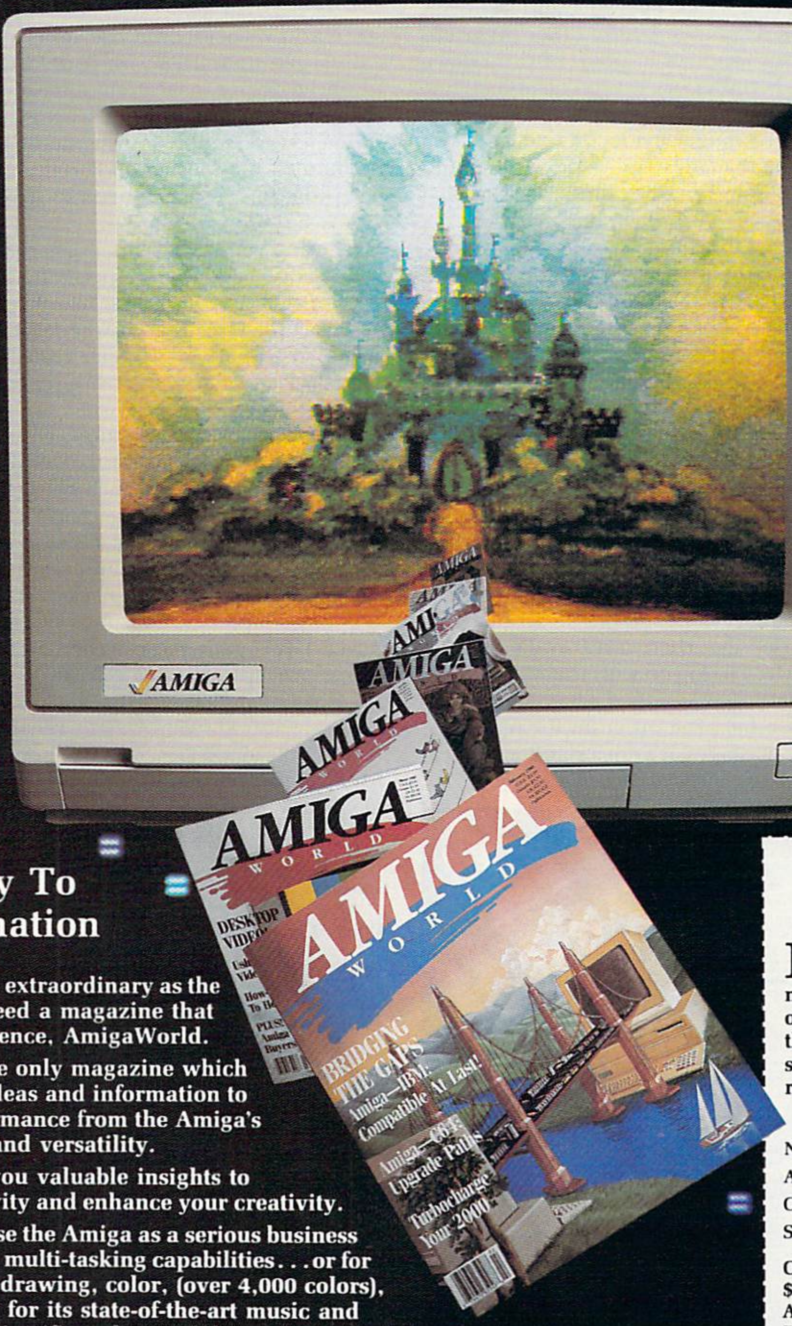
PortalX / Portal



LIKE BUTTER ON corn, or mustard on a Fenway frank, PortalX is a necessity if you subscribe to the Portal network. Written by Steve Tibbett, the first version of PortalX appeared in early 1992. The latest version

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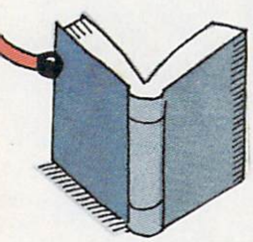
(1.30) became available at the end of 1992 just as this article was being written—causing me to scrap an earlier (and far less satisfactory) version (1.10) that had been parked in an obscure hard-disk directory. Fortunately, this newest version needed no time to mellow before use.

As with the other front-ends in this roundup, you can't use 1.3 or earlier versions of the Amiga OS. We're talking 2.04 or higher here, and no exceptions. Earlier versions of PortalX were gratis for the taking; version 1.30, however, is a $30 shareware program.

While PortalX has the same basic mission in life as the other front-ends, it looks, operates, and performs in an unconventional manner. Unlike other programs of this genre, it uses windows in place of drop-down menus. To be sure, PortalX does get you on and off line in a hurry; it performs all the time-consuming, budget-busting writing and reading activities off line, and then logs you on when you're ready to move those files. Minimal screen activity, however, gives little evidence that all of this is taking place, until you understand both the network and PortalX's functions.

Scripts for logging on are bundled in the lha-compressed archive with PortalX. Tymnet is my primary connection to Portal, so I opted for the corresponding script. Try as I might, the Tymnet script would not log me in properly, or at all, for that matter.

After several frustrating minutes, I called up a text editor from the hard disk (necessary because PortalX arrives sans editor) and examined the Tymnet script; even my sleep-deprived eyes noticed the code deviated quite a bit from the norm. An accompanying Sprintnet script, however, bore a closer resemblance to my terminal package's script, so I merely substituted the code needed by Tymnet, renamed the script, and used it as my personalized PortalX Login Script. To avoid a similar ordeal, be advised that there is a PortalX support area on the network to help you with these and other problems.



While PortalX is a fantastic program for retrieving E-mail and posting messages, it's not a stand-alone terminal package for Portal. The program uses a public screen named "PORTALX" to accept text from a text editor or word processor that can produce ASCII files to create messages to be uploaded to Portal. You'll want to keep your favorite terminal program handy, too, since you'll continue to use it to access older files, to participate in the live forums, and to make use of Portal's Internet Services facilities. As a stand-alone program operating outside of your terminal software, PortalX is not designed to handle live chatting or Portal's Internet Services.

Finally, On With the Show

Once you've overcome the quirks in the supplied scripts, getting started with PortalX doesn't require an advanced degree in telecommunications. Just fill in the blanks in the configuration process. A "Set Signature" option lets you supply your signature to bid adios at the end of messages posted on Portal. As with other front-end programs, you also need to specify your modem device and the baud rate.

Entering your user name, password, and local telephone number, and even specifying how to hang up at the end of a session, is also mandated. Options allow you to set the screen mode when using AmigaDOS 2.1 or higher (a particularly nice feature), and there are also provisions for saving or using the current configuration for one session.

PortalX's primary function, collecting "subscriptions," sounds like some kind of electronic Book of the Month Club promotion. Such subscription collections, however, are nothing more than visits to areas where you commonly read posts on Portal. Just log on to Portal with your favorite telecommunications program, go to an area, and enter "subscribe." (To remove a subscription, simply type "unsubscribe" and that area is removed.) Text gathered can then be read off line.

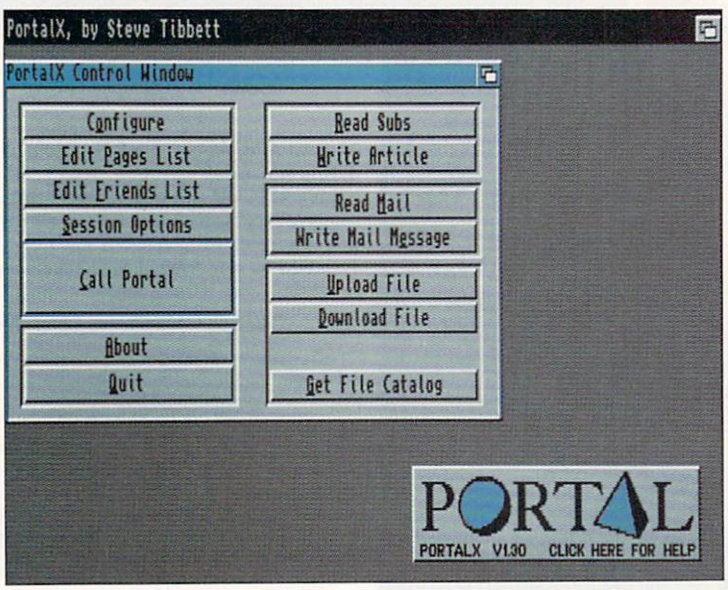
Session Options allow PortalX to automatically download mail messages that you can also read off line. There are also Kill Mail (deletes retrieved mail) and the before-mentioned Get Subs options.

Odd appearance and unique operation aside, PortalX is a must for all Portal users. If you subscribe to several areas and want to minimize the amount of time you spend on line, there is really no other software for the task.

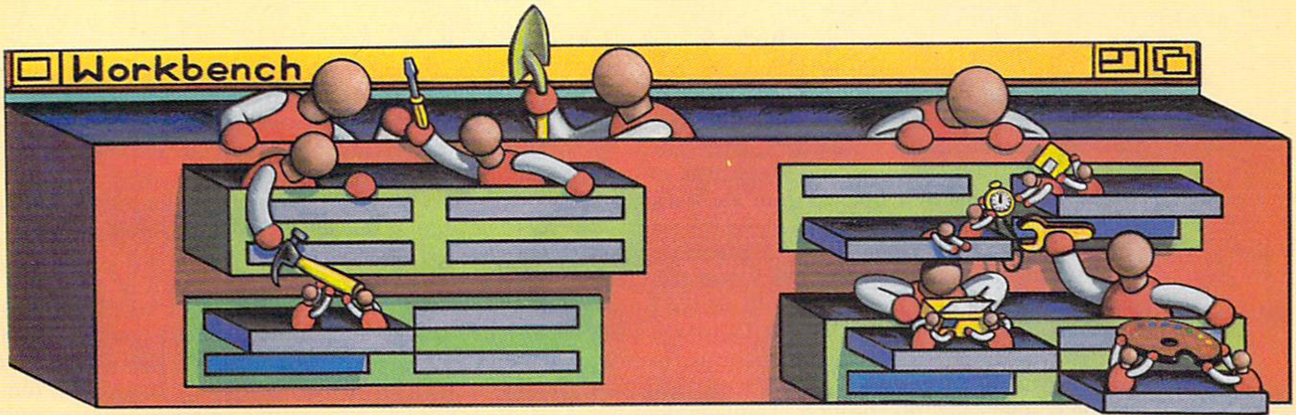
Time To Log Off

Because each of these programs is specific to one network, it may not serve any real purpose to name which front-end is the "best" or even my personal favorite. But when it comes to functionality, speed, and overall refinement, Aladdin wins hands down. Purely from the user's standpoint, it's the most time-tested, bulletproof, and well-executed program of the lot.

Because they *are* more recent, however, AutoPilot and PortalX have plenty of scope for improvement. Each has already gone through one or more revisions—with the results having been all for the good—and I highly recommend them to users of CIS and Portal, respectively. And I hope that the authors of all three of these programs continue to take advantage of improved screen modes, file requesters, and other enhancements to the OS. The possibilities for better, cheaper telecommunications are extensive, and users will greatly appreciate the results. ■



The new (1.30) version of Portal offers improved performance.



Digging in to DOS

A SERIES THAT EXPLORES THE AMIGA'S RELEASE 2 OPERATING SYSTEM

In part 5 of our examination of 2.0, we conclude the discussion of fonts, and introduce Preferences.

To finish the investigation of fonts we started in the last installment, we must take a look at user Preferences, another area in which some very interesting enhancements were made in release 2. In Workbench versions 1.3 and below, there are a fixed number of Preferences selections you can make—and size and style of text fonts are not among them. In versions 2.0 and above, however, the Preferences system has been opened up, allowing for the addition of new settings and editors for these settings. This new system makes it so easy to expand the range of these settings that new Preferences options have been introduced in each of operating-system versions 2.0, 2.1, and 3.0.

As with AmigaDOS 1.3, the Preferences editors are located in the Prefs drawer of the new Workbench. Instead of a single large (and confusing) Preferences program, however, there are now separate programs for each type of setting. Some of these programs, such as the Printer Preferences editor, are almost identical to their 1.3 counterparts. Others, including the Time editor, perform the same functions as before but are now much easier to use. And the Font editor is one example of programs that provide entirely new functionality.

THE CHARACTER ISSUE

The new Font editor was designed to give you more choice than that of the old Preferences program, which restricted you to 60- or 80-column text. When you open the Font editor, it presents you with buttons that let you select separate text fonts for Workbench Icon Text, Screen Text, and System Default Text.

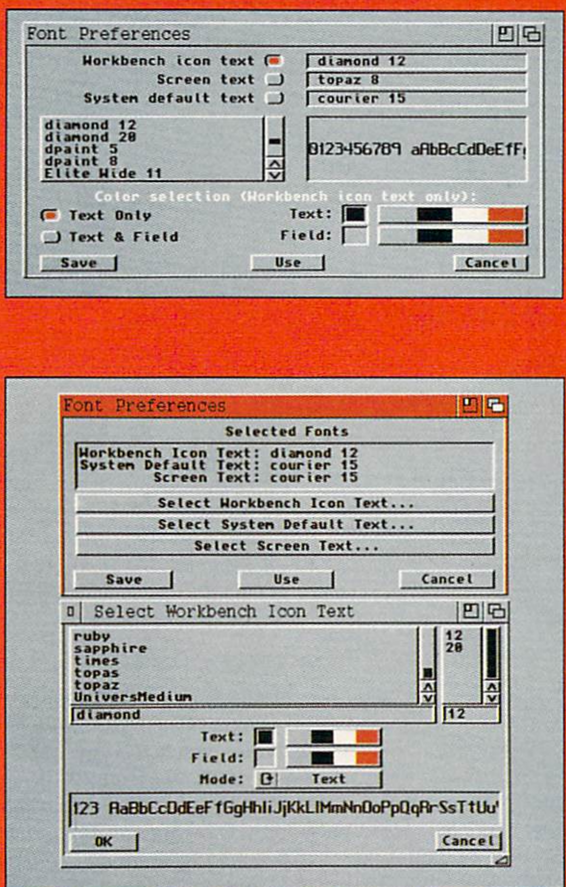
Workbench Icon Text is, as you might guess, the font in which names appear under icons on the Workbench screen. Your selection here allows you to control not only the appearance of the Workbench and the legibility of icon text, but also the space between icons. Because the Cleanup selection of the Workbench menu now takes into account the size of icon text, you can spread your icons out by enlarging the text and then cleaning up each window. ►

BY SHELDON LEEMON

ILLUSTRATED BY BARTON STABLER

The meaning of "Screen Text" is a little harder to guess. That's the font in which the operating system displays text for menu bars, title bars, and system requesters. To change this font, the editor must close all of the windows that were opened from the Workbench screen, close the screen, and reopen it with the new font. Therefore, prepare to close all your applications when you select a new Screen Text font. What does this mean for compatibility with older software? Many pre-2.0 applications assume that the title bar employs a very small (short) font, so if you select a larger font, the title bar may overwrite the top of the application screen. While this may be cosmetically unappealing, it usually does not cause problems in the operation of your programs.

Ironically, while both Workbench Icon Text and Screen Text are generated by the operating system, System Default Text is not. It is the text style that such applications programs as the Memacs text editor and the Shell get if they do not specify a font. This setting is the one most likely to cause a problem, since applications programs are much more likely to be font-unaware than the operating-system programs. An application that expects its font to be smaller than it is may try to position text where it cannot be read.



The 2.0 Font Preferences editor (top) displays only the type styles and sizes it finds in the Fonts: directory. The 2.1 Font Preferences editor (bottom), however, allows you to type in a new size for any type style.

Making Choices

The actual font-selection process varies slightly depending on whether you use version 2.0 or 2.1/3.0 of the operating system. The initial 2.0 Font editor uses a single screen for all three selections. Its old-style font requester displays only existing typefaces and sizes and does not let you create new sizes by scaling existing fonts. The editor in version 2.1 presents a separate font requester for each type of text, and uses a newer style requester wherein you can specify a new type size for the system to create. With either editor, however, there are a couple of variations in choices you can make for a particular type of text.

When selecting icon text, you can choose the color of the text and, optionally, the color for an opaque background behind the text. This is necessary because a new WBPattern Preferences editor allows you to change the color and pattern of the Workbench windows, and the default text color may be illegible with some combinations.

One other thing you may notice is that the font requester for System Default Text does not list all your fonts. Only the few monospaced fonts (those, such as Courier and Topaz, in which all characters have the same fixed width) appear in the list. All the other fonts (Ruby, Diamond, and so on) are proportional, meaning that such letters as l and i are narrower than w and m. Proportional fonts look better, but they are harder for programs to handle. Because a number of applications do not display text properly using proportional fonts, the Font editor will not let you select a proportional font as the System Default font.

The Amiga console device is one of the major programs that has difficulty with proportional fonts. For that reason, the SetFont command mentioned last month does not allow you to install a proportional font in a Shell window unless you add the keyword PROP at the end of the command line to override this safeguard. For a good example of the problems some applications have with proportional fonts, type the command

```
SETFONT Times 18 PROP
```

in the Shell window. Notice the long space after your prompt? If you type the DIR command, you will see that the Shell breaks each line up into two lines because it thinks that it has run out of space, even though it has printed only halfway across the screen.

Ready, Set

As with all the new Preferences editors, the Font program allows you to save multiple settings. Using the Save As menu item, you can save your settings to a file along with an icon. From there, you can load the settings directly without running the Font Editor program. You can also load these settings using a CLI command, either from the Shell window or as part of a script.

If you have applications that do not work well with your System Default font, you may be able to avoid these problems by using a script that changes the System ►

Default font, runs your program, and then changes it back. To do this, you first need to save a Font Preferences file that uses the the same icon and screen fonts as your normal Preferences setting, but uses Topaz 8 as the System font. For this example, let's say you call this settings file Topaz8.pre (sys:prefs/presets is the default directory in which presets are saved). Then, you will be able to launch the program with the following script



The new Workbench easily handles even the largest fonts. When the Screen Text font is too large to allow it to display a menu in a single row, it uses two rows.

```
Font from sys:prefs/presets/topaz8.pre use

Run <>nil: Program

Font from sys:prefs/env-archive/sys/font.prefs use
```

where Program is the name of the program you want to run. The second Font command restores the default settings found in the file sys:prefs/env-archive/sys/ font.prefs. If you prefer, you can create for this script a Project icon that uses the c:Iconx program as its default tool. This way, you can launch your program from an icon.

The new font Preferences options that give you such flexibility in choosing type styles for displays are by no means the only such enhancements found in 2.0 and above. Next time, we'll take a look at the other new Preferences editors in versions 2.0, 2.1, and 3.0. ■

Sheldon Leemon recently finished the fourth edition of the ***AmigaDOS Reference Guide*** *(Compute! Books), a guide to using the CLI under operating-system releases 2 and 3. When he's not writing, you can often find him at Slipped Disk, a Detroit-area Amiga dealership.*


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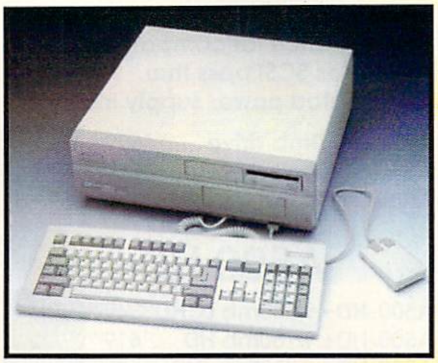
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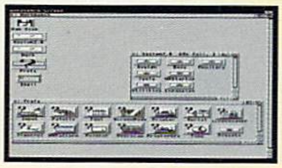
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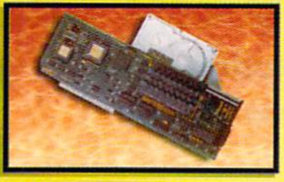
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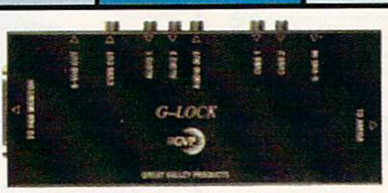
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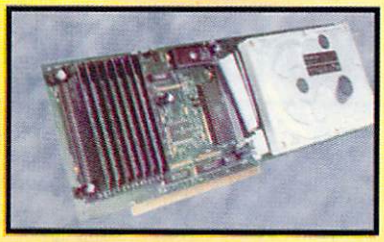
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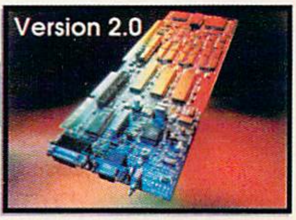
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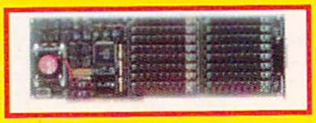
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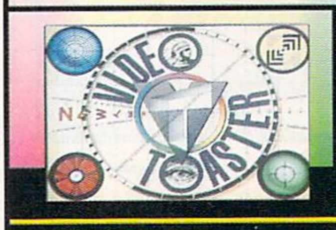
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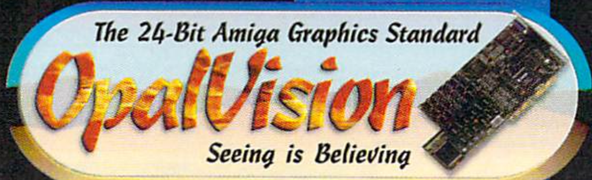


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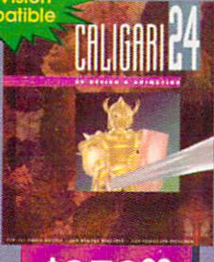
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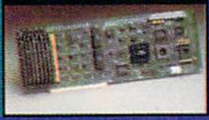
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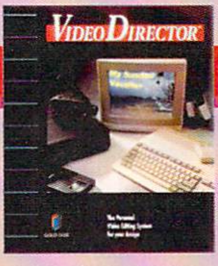
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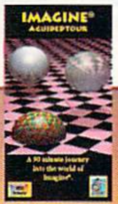
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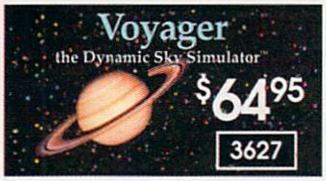
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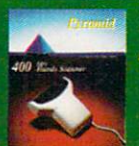
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Combining Traditional and Computer Techniques

49

A continuing series of tips, techniques, and tricks for creating more imaginative Amiga graphics.

By Joel Hagen

WHILE "ACCENT" IS, by necessity, a column about using Amiga computers for artistic purposes, computer art, generally, is too often perceived as a replacement for traditional tools and techniques. Some of the most interesting artists I know are those who, instead, have smoothly incorporated the computer into their studios as one of many tools kept at hand for creative work. This column will explore ways you might integrate the Amiga into a working studio environment, using it in conjunction with traditional media.

From Conte to Computer

I like the bold strokes one gets from the broad side of a piece of conte drawn across rough paper. Achieving strokes like these from a paint program will probably remain a challenge to programmers for some time to come, so I often find myself with conte in hand rather than a mouse. In drawing from live models, I sometimes use the Amiga as a secondary tool to complete a composition while preserving the look of the conte. The accompanying illustration shows an example of such a two-stage drawing. The original conte drawing was a tall, vertical composition. Looking at it days later, I could see an interesting horizontal composition I wanted to explore.

I scanned the top half of the drawing into the computer as a 16-level gray scale. In DeluxePaint (Electronic Arts) 640X400 mode, I created a horizontal composition with the figure on the left and a gradient fill to the right. With a one-inch brush in Smear mode, I dragged a few arcs into the gradient to loosen it up a bit, altering the mechanical orderliness of the dithering.

On a whim, I took a few experimental swipes at the back of the figure's head. Some kind of headgear and crest seemed to emerge from the smear, so I made a more deliberate effort utilizing the Undo button until I liked the result. Switching to Shade mode, I enhanced the striations in the headgear left by my smear strokes. Using the airbrush in Shade mode, then in Smear, I did a major retouch of the area between the arm and chest that had not gone well in the "no-second-chance" world of the original drawing. I added the final touches with a small brush and changed the palette to sepia conte tones; the image was finished.

My goal had been to preserve the character of the original conte strokes while making major changes to the format and value composition with computer tools. Creating the headpiece and crest was unplanned, but developed easily thanks to the freedom of the Undo feature. I now use the image either directly on the monitor or as a 35mm slide.

Moving a painting or sketch into the computer while it is still in progress can open many useful avenues of exploration. Whether you capture the picture with a scanner or a video digitizer, you can then manipulate the digital version of the image instead of the original. For example, a captured sketch can be experimentally cropped and recomposed with any paint program. Its image elements can be cut as brushes, resized, moved around, flipped, stretched, tilted in perspective, and then placed back into the composition. With a little touch-up, that image can serve as reference for a traditional-medium painting, either as a printout or viewed directly on the monitor while you paint.

Digital Experimentation

Often while I work on a watercolor, oil, or acrylic, adjustments of overall color and value seem desirable. Experiments of this sort done directly on a painting can be tense. You can, however, safely modify and explore a digital version of the painting. Art Department Pro (ASDG), PIXmate (Progressive Peripherals), and Imagemaster (Black Belt) allow the artist to play with the color bias, simulating oil glaze effects or watercolor washes. The artist can also

Don't forget that your Amiga is just one element in the overall creation of a pleasing work of art—as these computer/traditional-medium techniques will demonstrate.

reduce or enhance contrast to experiment with the value composition. In Digi-Paint (NewTek) or DCTV Paint (Digital Creations), controlled colorization of selected areas of a painting is easy. A hundred experiments can be tried digitally before committing paint to the canvas itself.

You can even give a digitized painting a new set of colors. While automatic remap features exist in programs such as DeluxePaint, they are designed to logically replace old blues with new blues, old greens with new greens, and so on. Manually replacing a palette with a new one can yield more deliberate results. One way to try this is to digitize your painting in a palette of eight to thirty-two colors. Reduce dithering in the image by dropping Digi-View's Sharpness slider or by averaging the final image in ADPro, PIXmate, or Imagemaster. While remaining in any of these image-processing programs, let the software sort the palette low to high and save the image.

Next, digitize or paint a new palette of the same number of colors, sort it low to high, and save it. Load the original painting into DeluxePaint. In DPaintIV, simply load the new palette from the Color menu. In earlier versions, press the j key and load the image with the new palette to the swap screen. Press the j key again to return to the modified original. The consistent low-to-high sort preserves the visual structure of the painting.

A friend of mine uses this approach to create multiple color variations of fabric designs she produces with her Amiga. Try digitizing a vivid painting and use this technique to replace its colors with those obtained from digitizing a seashell.

If you use an art projector in your illustration work, try using the Amiga as a digital assembly stage prior to projection. Digitize the various elements, composite them in a paint program, and then retouch and print the image. Use this printout in the art projector to shoot the image onto your



In "Looking Out" (above), a conte drawing was scanned, then recomposed and finished in the computer, combining the style and character of a conte drawing with dithered computer gradients.

canvas or illustration board. You can even use the computer as a quick way to enlarge a scrap photo you are using for a portrait. Typically, an artist is given a few snapshots of the subject showing only a small face. A close-up grab with a video camera or an enlarged 300-dpi scan can be displayed full screen on the Amiga with enhanced sharpness and contrast. Then simply use the screen as reference while you paint. ■

Joel Hagen's credits include work in art, astronomy, science fiction, and software development. Write to him at 10512 Sawyer, Oakdale, CA 95361. Please include a stamped, self-addressed envelope for a reply.



The Ins and Outs Of Connecting

To make successful connections, you must make sure your ins and outs match. Here's what you need to know to get it right.

By Steven Blaize

"AFTER FIRST CONNECTING the output of the first playback deck to the input of the first TBC..."

Sound familiar? Confusing directions seem to be everywhere once you start adding video components to your "Complete Desktop Video System." No matter what level of experience you have in computers, video, or both, bringing together much of today's video and computer hardware presents challenges and often headaches. Why? For the most part, these devices were not originally intended to work together. The video and computer industries evolved (and are still evolving) at different points in time and, until just recently, had completely different audiences.

Industry leaders vying for market share present another problem. (The most famous example of this kind of phenomenon was exemplified in the videotape format battles between Beta and VHS.) Only recently have many companies become interested in mixing the two technologies, although most still want to use proprietary methods.

Where does this put us today? The answer is somewhere in the middle of the changing technologies. The biggest problem to overcome in making computers and video work together is the signal formats. Many computers, including the Amiga, output an analog RGB signal carried by a dedicated cable to an RGB monitor. This signal contains specific information for each of the red, green, and blue color guns housed in your monitor. A video signal, on the other hand, while generally analog, contains information with regard to color, picture levels, and sync.

Let me note that in this article I will stay away from technical terms and emphasize concepts. My goal is to assist you in understanding the different signals and what you need to make your computer signal into a compatible video signal. You may wish to review previous installments for information on the sync signals (p. 45, Jun. '92) and videotape formats (p. 60, Nov. '92).

Determining Rates

Although most computers' signals are designed to be viewed on an RGB monitor, all computer signals are not the same. Various computers and display cards output signals at very different rates. In order for you to see the picture, you need a monitor that can handle the signal rate output by the computer. In general, the higher the number (typically in Hz) of the signal rate, the higher the addressable resolution of display.

The standard Amiga display outputs a 15 Hz signal, which is exactly the same rate as a NTSC signal. This is a feature even of the original Amiga 1000, and is what gave the Amiga its early head start in video. All that is necessary to record the Amiga signal is a device that encodes RGB into a recordable composite signal. This permits the development and use of inexpensive encoders and genlocks to be developed for the Amiga. Coupled with the machine's animation abilities, this provided the push into video. Until the release of the Amiga 3000, however, our machine suffered in resolution standards when compared to the Mac or PC platforms.

The higher signal rates common on the other platforms and in the high-resolution modes of the newer Amiga AGA chip set make the conversion more difficult. Signals higher than 15 Hz require the addition of a scan-rate converter, which adds cost and introduces quality differences to these devices. This is important to understand. The high-resolution picture displayed on your computer must be converted to a lower-resolution-capable signal before it can be recorded to videotape. The methods and technology for accomplishing the conversion vary from device to device. If you plan to design at higher resolutions and convert the signal for video recording, you should pay close attention to the quality of the encoding device. Now with the understanding of encoding under our belts, we can move on to the next level of incompatibility—signal formats.

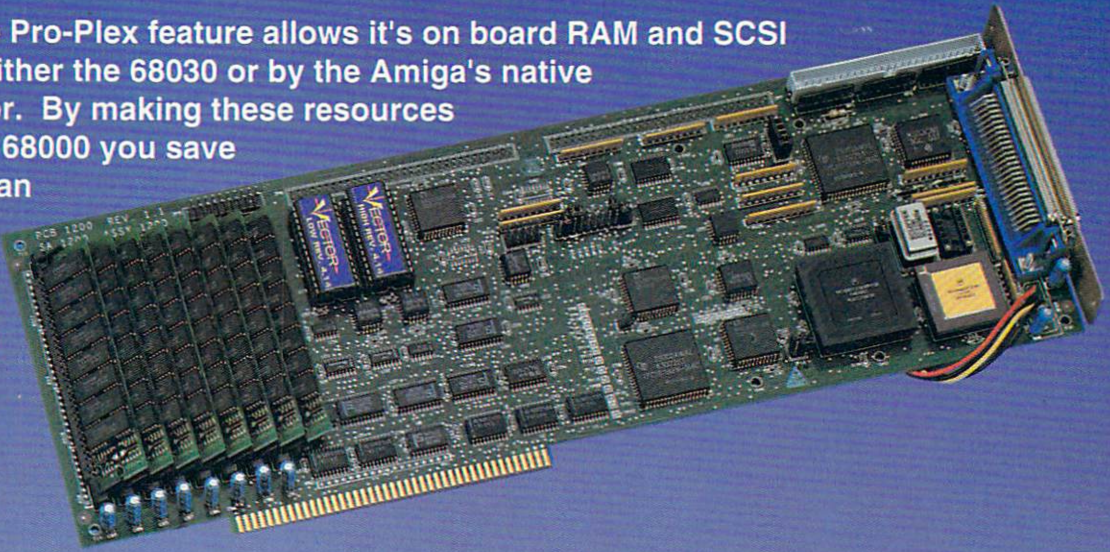
Sorting Signals

The NTSC signal format was originally developed to carry black-and-white picture and audio information. When color television was introduced, color information was incorporated into the same signal format in an attempt to provide backward compatibility. This is where the term composite comes from: ►

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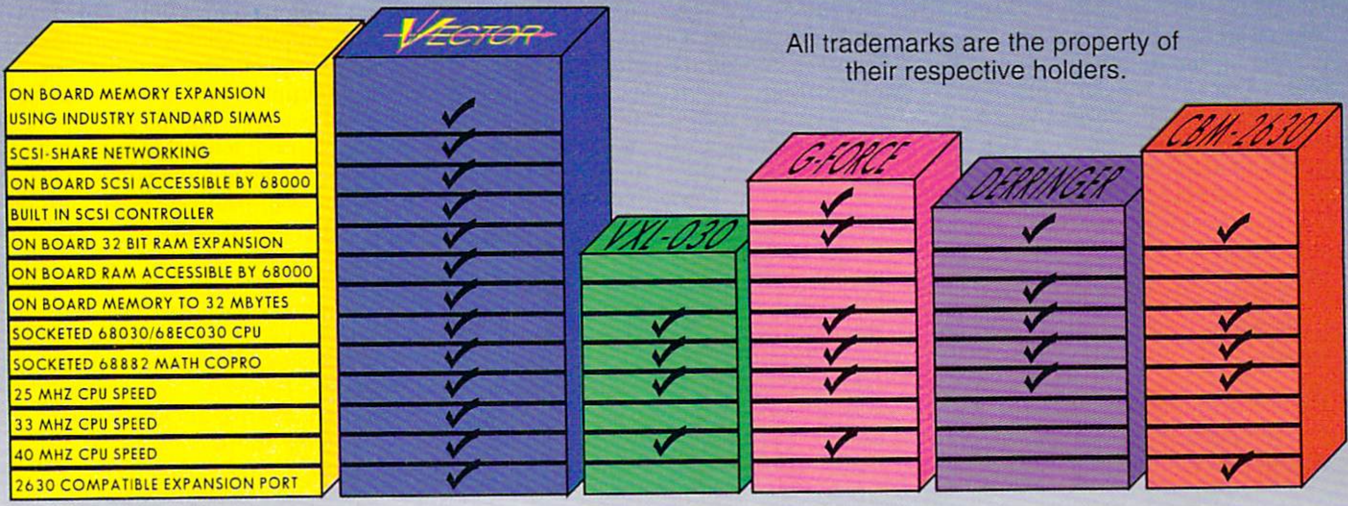
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The color and picture information are composited into one signal. While this is still a very popular and common format, the signal will degrade quickly as you make more duplications. This is one reason a duplicated VHS tape does not look as good as the original.

Often, people who do not come from a video background do not realize how quickly you can move many iterations away from the original source signal. As a simple example, an animation is put on tape and the tape is edited for timing and audio, this master animation is then edited in with other source video and the result is duplicated for distribution. In this case, the final tape is three generations away from the original. It is not uncommon to have four to five generations, and thus signal integrity becomes critical.

In an effort to handle this type of editing situation, companies introduced Betacam, Betacam SP, M, MII, D1, D2, D3, S-VHS, and Hi-8 signal formats. Most of these formats, except D2 and D3, deal with component signals. In a component signal, the color and picture information remain separate, and hence the quality of the information in the signal tends to degrade less quickly. Of course, the immediate question is, "Why all the different formats, and which is better?" The first part is easy: Different companies promote different formats, some of which have higher bandwidths than others, and some of which are digital rather than analog signals. Which is best for you depends on your requirements and budget. S-VHS and Hi-8 are convenient in size, ideal for field reporters, and are very economical, although they do not have the bandwidth of Betacam SP. D1, D2, and D3 are all digital and thus result in little to no drop in signal quality, but definitely come at a higher price.

Additionally, the developers of component signals came up with different methods of handling the information. S-VHS and Hi-8 both use a Y/C signal, which carries the color in one place and the picture in another. Beta SP, on the other hand, deals with Y/R-Y/B-Y, which is similar to the RGB components in the original computer signal.

Where You're Going

The computer outputs an RGB signal at a specific scan rate, the video-editing equipment accepts and records a different type of signal, and this videotape is then either broadcast or distributed for viewing. If broadcast is your goal, you must know the format of the tape that can be handled and be prepared to assure that the recorded signal is within broadcast specifications. As discussed in previous Video Suite installments, this is when you start seeing the difference in equipment prices. Broadcast-quality equipment is generally designed within specific guidelines and manufactured for greater durability. Professional non-broadcast equipment is designed with a balance of price, performance, and quality. For example, several S-VHS and Hi-8 edit decks are very good quality and may even meet broadcast specifications, but may not be quite as durable as, say, a Betacam SP deck.

Manufacturers have also developed different connections for these devices. This keeps the cable companies in business, but can drive you crazy if you have all the equipment you need and lack the right cable. Your RGB computer cable is likely to be a 25-, 6-, 8-, or 15-pin cable. Composite video typically requires one cable for video, and one or two for audio with either RCA or BNC connectors. S-VHS and Hi-8 almost always use 4-pin mini-din connections for the Y/C signal, while Beta SP and digital systems may include three BNC connections for the Y/R-Y/B-Y component video. Some video decks may also include 7-pin Y688 or 12-pin component dub connections.

Finally, new high-resolution and "true-color" (24- or 32-bit) display devices output different signals. The signals of some are identical to those already discussed; others output unique signals. Certain display boards can produce more than one type of signal, and a few can produce other signals with the help of additional equipment. For instance, Centaur Development's OpalVision is a 24-bit display device that outputs only an RGB signal; to record the image you need the optional genlock module, which is promised for release early in '93. This module should produce a composite as well as a Y/C (S-VHS/Hi-8) signal. The same is true for Great Valley Products' IV-24: It requires the VIU-CT module to transcode into S-VHS, Betacam/MII formats. Impulse's Firecracker 24 currently has only RGB out at the same scan rate as the original Amiga, and thus requires only an Amiga encoder or genlock to record to videotape.

Bend and Stretch

The solution to these problems is contained in the word "transcode." A transcoder is designed for one purpose only: to convert one signal type to another. This means if you have a computer that outputs only RGB, and a transcoder that can output composite, Y/C, or Y/R-Y/B-Y, then you can probably record to most any videotape machine. If this transcoder can also accept a variety of signal formats, you can put it between different videotape decks.

Like encoders and genlocks, transcoders vary dramatically in price, quality, and flexibility. You can, for instance, purchase a transcoder that goes specifically from RGB to Y/C with a 4-pin mini-din connection. If this is specifically your need, then this could save you a considerable amount of money. If, on the other hand, you need flexibility, you may need a transcoder with more inputs and/or outputs. Omicron Video, Alta Group, Nova Systems, Digital Processing Systems, and I.Den all produce a variety of video transcoders. And GVP's new and inexpensive G-Lock genlock also has some transcoding capability.

The bottom line is to consider and understand the differences in your input and output video signals. If you are using a video switcher, you must make sure that the input and output features are correct and compatible, and that quality levels are acceptable. Every computer, display board, video deck, and video switcher has not only input and output connections, but also input and output signal specifications. Check each one of these to make sure that each output is a compatible match in terms of connections, signals, cables, and quality with the next-in-line input. Next year may bring more connectivity, but for now keep your eyes open and check out the connections. ■

*Steven Blaize is owner of Creative Fire, a multimedia-presentation company, and co-owner of Texture City. He is an author, lecturer, and consultant on Amiga and DOS/Windows platforms, specializing in graphic design and 3-D animation. Write to him c/o **AmigaWorld** Editorial, 80 Elm St., Peterborough, NH 03458.*

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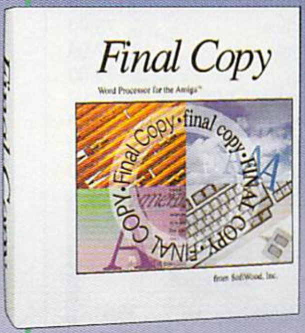
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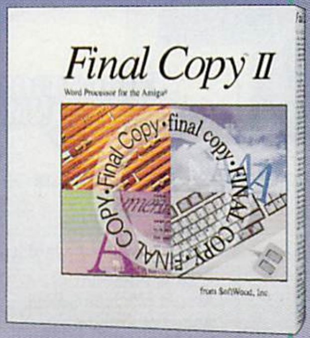


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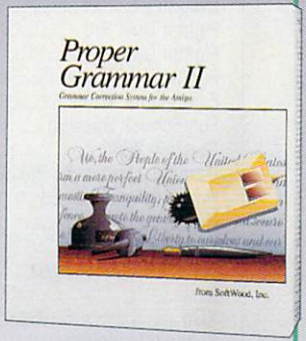
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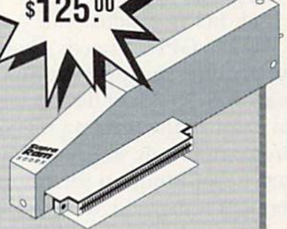
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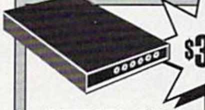
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From p. 32.
which fax is which.

Finally, GPFAX needs a hang-up-on-error routine. During reception of a fax, my machine ran out of disk space. It signaled an error to the sending machine, but the program simply stopped on my machine and never hung up the phone. Two subsequent tests yielded the same results.

Nits aside, I am very impressed with GPFAX and the SupraFAXModem. From top to bottom this is a quality act with more value per dollar spent than anything I've bought in a long time.

—Gary Ludwick

GOLDEN GATE 386SX / MONITOR MASTER

Vortex Worldwide, $599, $148.

A2000, A3000, A4000.
Internal, PC-slot connection.
Installation: Moderate.
Hard-drive-installable software.
Not copy protected.
2.0 compatible.
Accelerator compatible.
Minimum system: 1MB of RAM.
Recommended system: 1+MB of RAM, hard drive, VGA card, multisync monitor.

IBM PC/AT emulation.

If you're like me, your workplace is littered with PCs. Using an Amiga is something of a compromise, because it is hard to bring work home when you use Word for Windows in the office and ProWrite 3.3 in the den. Wouldn't it be nice to have an emulator in your Amiga for these kinds of situations? In fact, there is a natural synergy that arises from housing both an Amiga and a PC in the same box, such as the ability to easily share files and exchange data.

With that in mind, Vortex brings us the leading edge in PC emulation today: 80386 and 80486 PCs-on-a-card. Unlike other PC cards I've tried, the Golden Gate 386SX includes just about all of the essentials for the price of admission and offers numerous expansion possibilities as well. (*While this review focuses on the 386SX, watch for our coverage of its big brother, the 486SLC, in the near future.*)

IT'S IN THERE

First and foremost, Vortex takes care of the basics. Your Amiga mouse does double duty on the PC side as a Microsoft mouse, provided that you install the driver (included with Windows and DOS). The PC can use the Amiga's parallel and serial ports, and, unlike Commodore's Bridgeboard, Golden Gate doesn't lock the Amiga side out of those ports while the PC is running. As for hard-drive support, an IDE interface is included on the card. While it's a snap to add up to two hard drives to the emulator, that's really gravy because you can use your Amiga hard disk as a PC drive, as well. About the only thing missing is the ability to emulate a PC game port with your Amiga joystick.

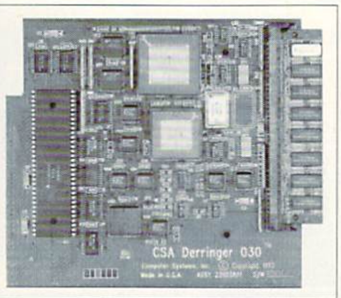
There are two empty sockets on the emulator. The first is for a math coprocessor. If you want to speed up your system inexpensively, try out the 387SX math coprocessor. It is rather a bargain at $129, and you can easily install it yourself in about 30 seconds. The other empty socket is for an optional floppy-disk controller ($89). Unlike the math coprocessor, which you can usually live without, you almost certainly need this chip. Out of the box, Golden Gate can read and write 720K 3.5-inch disks directly from Amiga drives and, with a 5.25-inch drive, can use low-density 5.25-inch disks as well. Most software in

Continued on p. 96.

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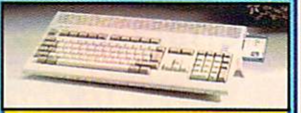
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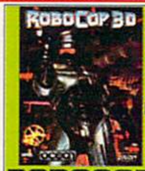
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From p. 92.
the PC world is shipped on high-density 5.25-inch floppies, however, and to access these you must get the optional controller.

Golden Gate comes equipped with 512K of RAM—barely enough to boot a PC these days. I think Vortex should have included more, even if it meant a slightly higher list price. Nonetheless, the four sockets on the card can hold up to 16MB of RAM, twice the capacity of the Commodore 386 Bridgeboard.

Vortex has a few tricks up its sleeve that may interest you. If you have plenty of Amiga RAM, you can tell the PC to use some Amiga memory in addition to its own. (In the A3000 and A4000, the Golden Gate does not recognize motherboard fast RAM.) Amiga memory is accessed more slowly than the zero-wait-state chips on the emulator, but this "economy RAM" can save you some cash for very nearly the same functionality.

Taking a different tack, allow me to remind you that SIMMs are less expensive than Amiga RAM. Interested in adding more memory to your Amiga? Vortex lets you dedicate two or four megs of the emulator's own RAM to the Amiga. This is a good way to expand your A2000, because the RAM is always available for your PC with just the flip of a jumper.

Plug It In

Golden Gate has a slick installation procedure, allowing for a few minor idiosyncrasies, such as the installer program carelessly dropping extraneous files and empty directories on my hard drive. Otherwise, software installation is a snap. The manual separately discusses hardware installation for the A3000 (which took about 30 minutes) and the A2000 (somewhat more involved, as you must remove the 68000 and replace it atop Vortex's adapter).

With the hardware and software in place, you configure the system. Most features are configured directly from the set-up program that runs right before DOS loads. Using it, you may create a PC hard disk on your Amiga drive from an entire partition or a single file. Once set-up is done, simply format the hard disk in MS-DOS; there are no special software steps in between.

The set-up program also controls display emulation: Vortex supports a wide variety of modes on a 1084 monitor, from CGA to monochrome VGA. The display is somewhat slower than a real display card provides, although an accelerated Amiga remedies this somewhat.

Are the supplied display modes sufficient? Considering that the 386SX is designed for the power user, I doubt it. The clear choice is to buy a VGA card and use a multisync (or VGA) monitor. I purchased an SVGA card (for under $110) and switch between the Amiga's display and the SVGA output via Vortex's optional MonitorMaster. Like a standard video switchbox, MonitorMaster lets you display PC and Amiga screens on the same monitor. A keyboard shortcut swaps you back and forth as easily as pushing ordinary Amiga screens. It works flawlessly and I recommend it highly.

B.Y.O. MS-DOS

I said earlier that this is a very complete system. Oddly, one significant omission is MS-DOS itself—you have to provide your own copy. Once you are up and running, Golden Gate works as well as any PC I've used. Windows applications run fine, as well as most other programs I tried (excepting a game or two). After adding a math coprocessor, AutoCad and other specialized software requiring the chip also worked as expected.

I was quite impressed with the emulator. The hardware seems well engineered ►

Circle 71 on Reader Service card.

and professionally assembled. Additionally, it runs in the A4000 just as well as in the A2000 and A3000. Finally, the Amiga has a PC emulator that combines functionality and a reasonable price well enough that it's actually better than buying a clone. If you're in the market for a PC, take a serious look at the Vortex Golden Gate.

—Dave Johnson

VIDEOMASTER

Microdeal, $108.

Hard-drive installable.
Not copy protected.
2.0 compatible.
Accelerator compatible.
Minimum System: Amiga 500, 1MB.
Recommended System: 1+MB, hard drive with pass-through.

Hobbyist video and sound digitizing.

A low-priced digitizer aimed at video hobbyists, VIDEOMASTER not only records video and audio samples, but also lets you play them simultaneously in short, black-and-white, monaural film clips. (It does not output to video.) Overall, it's a fun, inexpensive package that is badly flawed by fuzzy images and puzzling design decisions.

VIDEOMASTER (VMAS) comes complete with the digitizer, recording and playback software, a manual, and red, green, and blue plastic filters for single-frame color recording. The unit requires live or prerecorded video and mono audio input sources. VIDEOMASTER's hardware component plugs snuggly into the A500 expansion port and does not contain pass-through. If your hard drive does not pass the bus, you must disconnect it to use the digitizer.

Small Motion

The video digitizer can shoot full-screen black-and-white and color images, but can't record full-screen images in real time for full-motion video. VMAS shoots full-motion, quarter-screen video images at two to 30 frames per second at 160x100 resolution in 16 shades of gray. It can handle still grayscale video images in higher resolutions—320x200, 640x256, 320x512, and 640x512. You can create quarter-screen video clips with partial color by importing nonmoving, 16-color IFF pictures. While this tedious process does not create live color video, it does allow for 16-color video titling and limited animation. Using the color filters VMAS can shoot still, full-screen video images in eight, 16, and 32 colors, or 64 colors in EHB and 4096 colors in HAM. Shooting full-screen still pictures is slow and is susceptible to blurring if the subject moves even slightly. Because the subject and camera must be absolutely still for at least ten seconds, the procedure is good only for still life compositions or for digitizing photographs.

If you're not happy with your recorded clips, you can edit them. You can cut or add frames to the sample or even grab quarter-screen, grayscale, still images from the video source and incorporate them into a prerecorded clip. A toggle lets you flip between one frame of the video and the live video feed, which is very useful for stop-motion animation. You can play clips back at multiple speeds or step through them frame by frame. You can even watch a black-and-white video feed (including TV) in a window and hear a mono audio feed from the Amiga speaker.

The audio digitizer records sound samples in IFF, AVR, and SPL formats (and also loads 8SVX and RAW files). You can fade the sample in and out, play it backward, crop it, change sampling speeds and volume, and watch the waveform during playback.

Both the video and audio screens allow integration of audio and video in recording and playback. You can record samples with live sound and video, or record them separately and link them later. Although it's fun to record simultaneous audio and video, the samples are cleaner if you record them separately.

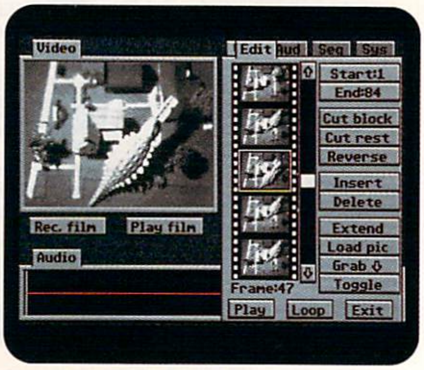
The sequencer combines video and audio signals into a full movie. Still shots, film clips, and audio tracks can all be merged into extended video sequences. This is a powerful feature, but unfortunately the controls are not as intuitive and easy to use as the other modes.

VIDEOMASTER's final mode lets you configure the video, audio, and memory settings. While you can control the distribution of memory into audio and video segments, the program does not let you determine how much of the total system memory the software uses. This makes multitasking difficult, because VIDEOMASTER grabs all available memory before you start shooting clips.

VMAS in Action

Playing with the VIDEOMASTER digitizer is a fun, although very limited, experience. Splicing together short VCR clips with short homemade clips can make interesting effects. The stop-motion video tools are especially good.

Although professionally recorded video images digitize well, getting a quality image from the video camera requires a lot of experimentation. The most complex part of the operation is digitizing still-frame color images. In my tests, the color images tended to be faint, washed out, and saturated with red. Greens were usually overpowered by red. The plastic filters are very tricky to manipulate. By snapping pictures at different intervals in the filtering process, I was able to get more natural colors, but the pictures were still weak and washed out.



VIDEOMASTER's Edit screen is your computer cutting room.

The manual has a lot of interesting information, but is poorly written and badly edited. The worst part of the product was the tech support. There was none. I called the listed Microdeal tech-support number a dozen times to ask about improving the quality of the images, but I never got an answer.

I hesitate to recommend VIDEOMASTER, even to A500 owners who want an inexpensive way to try black-and-white video digitizing. Although it is an engaging toy, it's difficult to use without a hard drive, expansion memory, and technical support. Because the video images are so small, the clips so short, and the filming options limited to black and white, there is not much you can do with VMAS apart from whetting your appetite for real video-digitizing equipment.

—Daniel Greenberg

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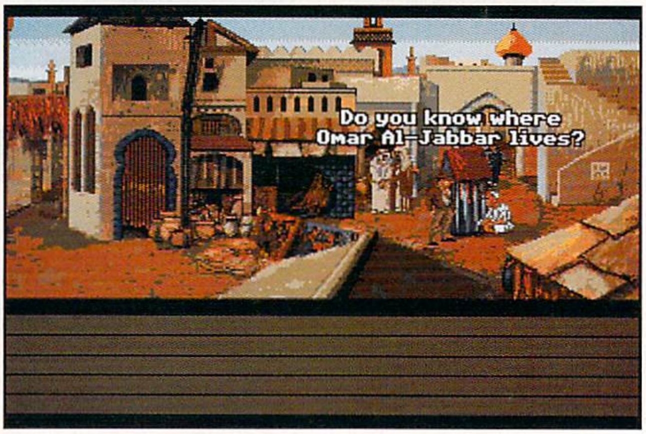
INDIANA JONES & THE FATE OF ATLANTIS

By Jeff James

IF YOU THOUGHT you'd seen the last of Indiana Jones, think again. Everyone's favorite globe-trotting, bullwhip-wielding archaeologist is back for more adventures in ***LucasArts'* Indiana Jones and the Fate of Atlantis** ($59.95). The year is 1939, and the Nazis are up to no good (again). This time you must help Indy thwart their plans to find the Lost City of Atlantis and use its secrets to rule the world.

Guiding Indy in his quest to defeat those goose-stepping goons of the Third Reich is facilitated by LucasArts SCUMM interface, used in such LucasArts products as Secret of Monkey Island and Maniac Mansion. Moving Indy (and his feisty female sidekick, Sophia) about the screen is as simple as clicking on a spot and watching Indy walk there. For more complex tasks, a verb list in the bottom left corner of the screen offers commands that manipulate the game environment. Finally, a scrollable list of carried inventory items occupies the bottom right of the screen. When communicating with other characters, a list of what things you'd like Indy to say appears at the bottom of the screen. The dialogue with other characters is especially amusing, particularly Indy's verbal sparring with Sophia.

Ported from the 256-color VGA version, the Amiga graphics aren't too shabby. Some screens are overly dithered, making the quest for small items difficult. The music is top-notch, subtly changing based on the player's situation. In addition, Atlantis features three separate adventuring paths that are tailored for certain types of players. The Wits path requires you to use mental dexterity to overcome obstacles; if you'd rather pummel Nazis and race cars, take the Fists path. Finally, the Team path emphasizes cooperation between Indy and Sophia. Each offers different puzzles and solutions, making Atlantis truly three games in one.



You'll need fists, wits, and women to win at Indiana Jones.

Given the size of the program, you'll be swapping the 11 disks frequently without a hard drive (with 9.5 megabytes free). Atlantis runs a trifle sluggishly on unaccelerated Amigas; more than one meg of RAM and/or an accelerator speeds up things nicely. ►

CRIB NOTES By Peter Olafson

I'd intended this to be a sort of free-for-all column tackling various problems in Ultima VI: The False Prophet (*Origin*, $69.95). But it looks as though most of the trouble is centered around the long, drawn-out business of the pirate's map.

The map shows where to find a treasure that includes the missing second part of the tablet Mariah needs to translate the Book of Prophecy. Unfortunately, it's been divided in nine pieces—the better to keep any individual pirate from getting to the loot.

I should warn you, however, that the whole map affair is a bit of a canard—it's reportedly possible to finish the game without it. (You'll eventually learn the language on your own, and, even without it, what Mariah says isn't too meaty.)

On the other hand, this long string of quests *is* a way to gain experience, to see a lot of neat things you'd otherwise miss, and to play the game as it was designed to be played. No one's breathing down your neck except a dragon or two, so why rush? (Even the hard way needn't be all that hard: The pickpocket spell and that worry-free staple, invisibility, will take you a long way.)

Don't worry about the map at all until you've reached Buccaneer's Den and met Homer. He has one of the pieces, which he'll hand over only when you come back with the other eight. Of course, he won't say *boo* until you join the Thieves Guild, and that means another quest—to the caverns beneath the Britain sewers where you must relieve Phoenix of a particular belt. (Yup, the same person referred to in passing back in the November issue, just north of the underground lake.) The pickpocket spell will do the trick here, and you can also use it to get her magic armor and glass sword (and more that's worth taking).

Once you belt Homer he'll tell you about five pieces, and Sandy will fill you in on the final three. Naturally, he wants something first—a dragon's egg—and the dragons are a nasty crowd. You'd do well to remain invisible during your visit to their cave in Dungeon Destard.

A couple more pieces can be found down around Trinsic. (Visit Lord Whitsaber in the city, and seek out the gypsy Arturos to the northeast.) Morchello has another (try the tavern in Serpent's Hold), Bonn on Dagger Isle still another, and a third can be found in the ►

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Problems with overly dithered graphics and sluggish play aside, Atlantis is a well-crafted adventure with much to offer. With excellent music, longevity, and all the elements of a classic Indy quest, Atlantis is an adventure not to be missed.

Road Rash

By Peter Olafson

TURNABOUT'S FAIR PLAY. The Amiga gave the Sega Genesis many of the 16-bit console's earlier titles, so it seems only fitting that the Genesis give some back. **Road Rash** ($49.95) is the second Genesis-to-Amiga conversion from ***Electronic Arts***, and it preserves intact the happy violence and breakneck pace of the original.

It's a motorcycle racing game in which fists, clubs, and willingness to do the 140-mph bump are almost as important as speed and steering. You face a field of 14 punchy opponents over a variety of five twisting, hilly courses. Pull up beside 'em and sock 'em good (courtesy of the fire button), and they'll fall behind. Knock one on his can with a well-placed blow of a club, and watch him tumble in your rear-view mirrors.

If you do well, you win a cash prize, which goes toward faster, better-handling cycles, repairs after wrecks, and paying off the tickets you'll receive from the bevy of Irish cops. Once you complete all five tracks in a satisfactory position, you move on to the next of five levels. The courses are essentially the same—only longer and twistier, the opponents tougher, their bikes faster, and obstacles more plentiful. (The difficulty seems poorly pitched; I'm usually a miserable arcade game player, yet made Level 5 in my third session.)

This rough stuff is just a taster for the delightful dementia that is Road Rash. The wrecks are right out of a comic book. I've wiped out on a curve, torn head over heels through shrubbery, tumbled down the hill beyond, and dusted myself off only to discover that my fallen bike had been punted a quarter-mile down the highway by a passing car. Then a fellow biker coming off the hill landed on me. It's all in fun, however, and the cyclists shake everything off—occasionally to accompaniment of cartoony effects.

The two-lane blacktop is a progressively darker nightmare of hill and dale, tight curves leading into tighter curves, blind spots, and head-ons in the making. It's also liberally sprinkled with



If you can't pass 'em, push 'em out of the way in Road Rash.

deer and cows (not to mention the remains of what those creatures had for breakfast), cars coming in both directions and from cross streets, construction barricades, and even other fallen riders. (Off-road, there's a wealth of charmingly rendered scenery.)

Not that you'll get much of a chance to inspect it. On a 68000-based system, Road Rash doesn't have the original's crazy speed, but the game flows along splendidly. (The update on a 68030 machine is absolutely blistering. After a while, it feels almost like real driving.)

In some respects, it even goes the Genesis version one better. The graphics are crisper, the sound cleaner and richer, and joystick control is far superior. And yet a couple of sugar cubes spike RR's gas tank: The dismounted rider looks a mite like Lumpy the Friendly Hunchback when seen from behind while running toward his fallen bike. And a few times, after taking a spill, I noticed that the biker ahead of me had stopped dead on the road. The game ought to disguise better the fact that other riders' performances are keyed to the player's; as it is, it spoils the fantasy a bit. RR is also fairly disk-intensive between races, and you have no choice but to play from floppy.

Nevertheless, this is a great game—it's the best arcade-style cycle race I've played.

CRIB NOTES

wreck of the Empire (which, if you have a sextant, can be found at about 71 degrees South, 15 degrees East).

Things get a bit hairy from here on in. Ybarra has one piece—didn't this guy and and the city of Skara Brae turn up in The Bard's Tale sagas?—and he's in a bloody inconvenient spot: Dungeon Shame. (The poor fellow's so hungry he's eaten his belt, and I imagine you can swing a trade.) Another is on Level Two of Dungeon Wrong behind a secret door in the Hydra's room. And then there's the one in the Ant Mound (at 21 degrees North, 66 degrees East by the sextant). It's a long way down, and can be found on a corpse in a big old cavern.

Get back to Homer to collect the ninth piece—if you haven't already pickpocketed it, you devil—and you'll be set for the final quest for the pirate's cache. (Be sure to pick up the Explosion spell—or bring a powder keg—to enable you to pass a certain reluctant door enroute.)

One more Ultima VI cheat: Remember that quick-karma trick I mentioned in passing a few issues back? Well, it's in there after all, along with two others, but it eluded me because it uses the numeric key pad rather than the main keyboard. Here it is: Holding down the Alt key, press and release 2, 1, and 3 on the key pad. After a sec, you'll be rewarded with a long, driver's-license-number-ish, alpha-numeric phrase in the command box—as well a niceoverhead map of your location. The first two digits are your karma. The next four are the time in 24-hour notation.The next three represent your party's X position, the three after that the Y position, and the final one the Z position. More on these coordinates in a sec. Holding Alt and pressing 2, 1, and 5 advances game time an hour—convenient if the party is at loose ends and hanging around to wait for a shopkeeper or some other wayward character.

Now, obviously the above coordinates aren't the same ones revealed by the sextant, but they're essential to this last cheat. To teleport immediately to any location, hold Alt as before and press and release in sequence 2, 1, 4. You'll see some indecipherable script (gargoylese?) and a prompt. Plug in the X, Y, and Z positions in that order, with a carriage return after each, and you're off to...somewhere.

The trick is to know where you're going before you make any but random use of the cheat. I just *happen* to have a list of locations, and let's just say your search for the pirates' treasure will be a whole lot shorter if you visit, oh, X=2C3, Y=343, Z=0. Don't forget your shovel. (It's item number 103 in the cheat editor revealed last issue.)

Next month: A visit to the Shadowlands...or maybe Atlantis. □

Tom Landry Strategy Football

By Peter Olafson

THERE'S A NEW quarterback in town. **Tom Landry Strategy Football** (***Merit Software***, $49.95) is quite simply the best football simulation available for the Amiga.

Features? TLSF seems to have everything except joystick control. A list would have to include modem play (including links with non-Amiga systems); penalty screens that make crystal clear the pluses and minuses of accepting or declining; sensible menus for control of the game clock; hard-disk installation and A3000 compatibility; a sweet stats-compiling package; extensive on-line help, including context-sensitive advice from Big Tom himself; a playbook thick as your finger; the ability to tear off a lightning game and to watch replays of its high points; facility to generate scouting reports and dump them to an ASCII file; a scenario editor that allows you set up chess-like problem-solving situations; intelligent copy protection; a very slick, easy-to-use mouse interface; generous information windows; and a realistic approach to injuries and fatigue.

There's more, too. I suppose I should have taken notes, but I was enjoying myself too much. Basically, I found that everything I wanted to do, I could do, and then some. TLSF is fun and easy to use, and never seems simplistic, as easy-to-use games sometimes do.

A flag gets thrown here and there. The graphics have classy sheen, but I wish the in-game screens were a bit sharper. (The game uses an unusual angled-down side view that put me in mind of a much spruced-up edition of Accolade's Fourth & Inches.) And I suspect more could have been done with crowd sounds than the short, cycled samples that every other sports game uses. (Earl Weaver Baseball still beats all comers hands-down in this respect.)

And it's not quite the ultimate all-in-one football package. Only Landry is obviously drawn from life—seasonal NFL data disks or a team editor would be a nice addition—and, as the title says, this is very much a strategy football game. If you fancy steering a runner downfield, you'd be better off with Electronic Arts' John Madden Football, which is still tops in the pure-action field.

But there are no obvious weaknesses here, and more strengths than I have fingers and toes. Tom Landry Strategy Football is the Super Bowl champ among Amiga pigskin games. They don't come any better. □

SHORT TAKES By Peter Olafson

Pinball Fantasies

Words fail me with this bit of genius from *21st Century*. Pinball Dreams was an amazing pinball simulator. The followup, Pinball Fantasies ($49.95), is even more amazing. There simply isn't much difference on an intuitive level between playing this and playing a real pinball game. Aside from the four great new tables (and the ability to import new ones) and added features (like extra flippers), PF has a thicker, more realistic slab of sound that establishes the game as even more of a physical presence. Hey, could ya work in the sound where the ball bounds up and hits the glass? Alas, one especially useful feature—hard-disk installability for the three floppies—is available only via a mail-in offer and costs an extra tenner.

Continued on p. 107.

Circle 20 on Reader Service card.

MORE SHORT TAKES

From p.105.

Shadowlands

A neat, quirky role-player from *Domark*, Shadowlands ($49.95) has delicate graphics, a huge play area, good individual character control. (You can have the four characters in very different places at the same time, which immediately separates Shadowlands from the mass of stand-by-me RPGs.) The game has a lovely half-lit atmosphere—just right, considering your characters are dead—and the moving light sources (a flickering ring of light moves with a character holding the torch) are eerily effective.

On the other hand, I'm not sure everything here really works. For instance, the idea of clicking on a particular limb of a character to perform a particular action is better than the reality. (It's awfully inconvenient in stressful moments.) And while the game's from England, the characters all look like refugees from a Japanese cartoon. Very strange.

Robocop 3D

The dead-ordinary sideways shooters based on the first two Robocop movies never prepared you for Robocop 3D ($49.95). It's from England's *Ocean*, it's based on a movie that still isn't out at this writing, and it's really brilliant stuff: a fast and even spooky three-dimensional arcade game. (There's also an adventure version in which the arcade segments appear to have been shuffled and linked.)

Developer DID has kept the range of the palette small—black, white, brown, gray, and gray-blue—and detail minor, the better to move Robo 3's polygons swiftly and smoothly (and swift and smooth they are). Love the approximation of the Robo's orders and targeting mechanism. And the opening shoot-out with robbers at the OCP building and the driving sequence are chilling as the game music. (There's even a sort of Rock-'Em-Sock-'Em Robots bit.) I can't put this down.

Quibbles: Robocop doesn't say, "Your move, creep." When you die, it takes too long to get back into the game. And when was the last time you saw a dongle used for copy protection? Lose this bit of plastic-coated circuitry (which plugs into a joystick port) and kiss your sweet game goodbye.

Vektor Storm

Hey, Tempest! Vektor Storm (*INOVAgames*, $39.95) is basically a straight Amiga implementation of that respected vector-graphics shooter, and it's a fine one. You're still shooting down the sides of a sort of galactic trashcan at various dangerous asterisks, toy boats, and squiggly lines. It hasn't lost any of its speed or addictiveness, and if you don't dig the default mouse controls, there's always the joystick or keyboard. Another game? Can do! A nice start for a new game company.

Conquest of Japan

Impressions' Conquest ($59.95) is to the earlier Fighting for Rome as Discovery (reviewed last month) is to Merchant Colony. This animated wargame, set in medieval Japan, is faster, easier to understand and control, and generally more fun than FFR (which uses a similar combat system). You can chose from a range of elaborate combat formations, and there's an autocalc function to finish up combat if it gets too interminable. (It does take a while.)

The problem is that the title is something of a misnomer. "Japan" here is just the central island of Honshu, and the "conquest" concept is just a ►

MORE SHORT TAKES

shell for pitched land battles, with no city-management elements beyond buying and transferring troops. It's really quite a small game. Nobunaga's Ambition this isn't. But then, it isn't the horrid Fighting for Rome either.

CYTRON

Paradroid '90 lives on in this very un*Psygnosis*-like, overhead-perspective, maze/puzzle game, clothed in the big Psyg's usual captivating intro, graphics, and special effects. (Love the seething explosion when time's up.) Your robotic tank uses (and is confounded by) conveyor belts, forcefields, pressure pads, and switches (which turn other devices on and off), collects tokens, and makes ash of the usual crew of enemy sprites to escape each level within an unforgiving time limit.

Neat tricks: Cytron ($49.99) can split up into two individual robots. (Sure this critter isn't called Voltron?) Computer termimnals scattered throughout levels offer mapping and more. Still, this lacks that one extra element that would put it over the top. Maybe just originality. I like it anyway.

SPOILS OF WAR

Not a bad little game of conquest from Germany, via the folks at *RAW Entertainment*. And not so little, actually: Spoils of War ($59.95) is loaded nicely with details and features—like the ability to move guns from one side of a ship to the other, specialization of units, and a combat system that takes experience and morale into account. This also means that SOW is not as quick a play as some conquer-the-world games—it'll take a while to get the feel of things—but it's worth the effort. Give this one a good look.

REALMS

Virgin joins the stampede of PowerMonger clones with Realms ($29.95). And, alas, while this animated wargame is pretty, challenging, and reasonably playable, it's just not a great deal of fun. The standardized battlefields make every conflict look like a medieval tournament—it's more like miniatures than like PM—and while the cities have tons of associated options, they're handled in the abstract. (This bit reminded me of Rings of Medusa.) It's hard to feel anything much about Realms at all, and I guess that's the problem.

CASTLES CAMPAIGN DISK #1: THE NORTHERN CAMPAIGNS

Here's a data disk that's not just a nice afterthought, but an essential addition to the parent game. *Interplay's* original Castles had a good heart but a weak mind and begged for some articulation. The Northern Campaigns ($29.95) provides it. There are new plots to thicken, a more extensive commodities market, and more troop and combat options (including troop training and more realistic combat capabilities for enemies). And if you're playing as a queen, she finally looks like a queen. We approve. □

THE NEXT ROUND

WORKIN' ON THE RAILROAD—You've got the building materials and the cash. Can you turn your single-track railroad into the transportation hub of a bustling metropolis?

A-Train (Maxis, $69.95) lets you try. You lay track and schedule trains. As well as passengers, they'll be carrying freight to the sites of the factories, hotels, ski resorts, and developments you're building. Need more capital? Speculate in real estate to build a bank roll.

As in the Maxis Sim- games, in A-Train simulated city inhabitants continue their work without your intervention; status reports and balance sheets will keep you up to date. Competing computer-controlled entrepreneurs will keep you sharp, often snapping up the big investment before you make the deal.

If you tire of A-Train's six supplied scenarios, the A-Train Construction Set lets you design custom playing fields. (RS# 101.)

FLYER FOR HIRE—When you boot Elite II (Konami), you join the Elite Pilots Federation and sell your services to the highest bidder. You're sent on a series of mercenary missions in this sci-fi adventure follow-up to Elite. To earn money for much needed ship upgrades and protection from space pirates, you can trade and sell cargo among planets.

All won't go smoothly, however, so be ready for 3-D combat sequences. Perform above and beyond the call while completing your mission and a new rank medal awaits when you return to base. (RS# 102.)

WANTED: HERO FOR LEGEND—The fortified medieval town of Mitteldorf is your home in Legends of Valour ($59.95), SSI's latest single-character, role-playing adventure. You'll have plenty of time to explore all 28 square miles of it on the game's more than 45 quests, but beware: not all neighborhoods and inhabitants are friendly, especially at night. You'll also have plenty of practice at real-time combat.

The auto-mapping feature helps you get your bearings in the 3-D city, while the forthcoming clue book ($19.95) will steer you around deadends. If you choose your character's attributes thoughtfully and treat the people you meet with respect, you'll go far. (RS# 103.)

JOIN THE FUN—Mark your calendars and start packing your suitcases. From August 19 to August 22 the 1993 GEN CON Game Fair takes over MECCA in Milwaukee, Wisconson. The fair features four days of computer, military, role-playing, strategy, miniatures, video, arcade, PBM, and board gaming, as well as tournaments.

If you don't want to play, there's still plenty to do. Go to the art show, enter the costume contest, bid at the game auction, watch the movie previews, spot celebrities, or stroll through the 200-booth exhibit hall. For more information, contact the sponsor of GEN CON, TSR Inc. (RS# 104.)

FULL THROTTLE—If you believe slow but steady wins the race, you'll never take first place in Cyber Race (Cyberdreams Entertainment). In this futuristic racing simulation you need to be fast and mean just to keep up. The race has no rules. Not only must you outrun the other vehicles in the multilane racing sphere, you must also contend with their dirty tricks. Vehicles are known to "mysteriously" demagnetize and fly off the secure track to crash against the racing sphere's inside wall. The graphics for Cyber Race were designed by Syd Mead, known for his work on such films as *Blade Runner, 2010,* Tron, and *Aliens*.

Farther down the road, Cyberdreams plans to release No Mouth. A graphic adventure, the game is based on the story "I Have No Mouth, And I Must Scream" by Hugo and Nebula award winner Harlan Ellison. (RS# 104.)

PLAN AHEAD—If you're designing a new game, tell us about it before it hits the store shelves. We'll tell the world when to watch for it and what to expect when it arrives. Send all the details to The Next Round, AmigaWorld, 80 Elm St., Peterborough, NH 03458, or fax them to 603/924-4066. ■

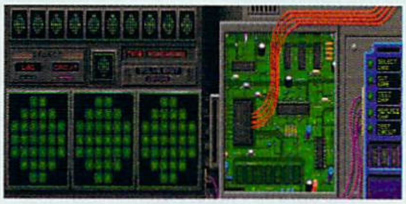
AMIGA WORLD Tool Chest

The AmigaWorld ToolChest, a quality line of low-cost software, presents power-tools for your Amiga. By purchasing this software you receive unmatched versatility, usability, and best of all, you support the independent Amiga developer. The "TSP" disk series are collectively grouped by theme for your easy access. The "RK" anthology are registered versions of the cream of the crop in shareware titles. The "TC" line, our premium disk series, is also conveniently available in our money-saving subscription offer. Amiga musicians make sure you check out our brand-new AM/FM series...they're packed with fantastic utilities!

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Disks	Price
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TSP55: DataBases II - Includes specialised program to keep track of Videotapes, Comic books, trading cards, magazine articles and CD's...5 programs in all! 1MB ram.
TSP54: EDPlayer This spectacular program looks and acts like a CD player and plays MOD music files (some included). Includes a spectrum analyzer, full programability, a simulated LED display, player-piano mode and more!! Requires 1 MB RAM.
TSP53: Term THE best terminal program for the Amiga. Full compliance with User Interface Style Guide. X, Y, ZModem, Quick-B, Kermit & others. ARexx, all display modes, fast and reliable. Requires Workbench 2.04+ & 1 MB RAM.
TSP52: Amiga Intuition Based Benchmarks Ever wonder how your Amiga stacks up to other Amy's? Extensive system tests and speed-checks will tell you.
TSP51: The Intrepid You control a tank in the frozen arctic trying to rescue hostages.
TSP50: Grinder This useful utility will convert between the following graphics formats: IFF, Ham-E, TIFF, Targa, PCX, Neochrome, Degas, GIF *and* JPeg!
TSP49: Moria This is a vast adventure game that will require hours of dedicated adnturing to crack. You must traverse an absolutely huge world/dungeon to defeae forces of evil. 1 Meg, harddrive installable.
TSP48AB: The A-64 Package This is a complete Commodore 64 emulator. Emulates saphics...everything (no fast loaders or timing-sensitive software.) Works on any Amiga with 1 meg. Two disks, counts as two.
TSP47: Chemesthetics This program will generate calotte models (3D full-color IFF pictecules. Quite beautiful pictures of even the nastiest molecules.
TSP46: Drafting MCad and Plans are both object-oriented drawing/drafting programs (sructured graphics) with all the pribjects you need to create any object. Landscape is a CAD (Computer Aided Design) program for laying out landscapes; once laidout, the computer wilnerate a stylized 3D representation of your landscape.
TSP45: AmigaDOS Replacement Project (ARP) This is the result of a very ambitous project to completely replace all of the AmigaDOS c: commands (DIR, LIST, ASSIGN, INFO, etc.)with more powerful, feature-filled programs. These programs are fully compatable with their Workbench 1.3 counterparts, but also offer more capabilities--including greatly enhancd wildcard support and more help for each command.
TSP44: MechFite is a role playing game where you control a giant robot and explore worlds, buy or find items, fight against other robots and aliens you are also required to fulfill some tasnd complete missions.
TSP42: 3D Master Explore the world of 3D modelling with this high-powered software. Create realistic raytraced 3D images. 3D Master is perfect to get your feet wet in 3D. It will require some experimentation to get the most out of it. Req. 1 MB
TSP41: Sealance Go on patrol in your nuclear Trident submarine and clear the seas of the vermen that pollute it. A complete simulation with all tactical weapons and defensive systems.
TSP39AB: Catacomb A well done graphic dungeon adventure game. Discover the secrets & treasures of the uderground maze and try to stay alive!
TSP38: Virus Utilities VirusX, KillVirus, Virus-Memory Killer, VK360 and ZeroVirusIII will let you sleep at night knowing your Amiga is 1000% virus-free.
TSP37: CheckBook Accountant This program has full budgeting/transaction recording capabilities. This program lets you balance your checkbook in 2 minutes!!
TSP36: Animation Two beautiful animations, Spigot and Watch. Both of these were created with 3D animation programs and are truly beautiful and smooth.
TSP35: HackLite This is a dungeon-adventure game of the highest magnitude...an absolutely huge world to explore that will task even the most hardened dungeon explorer for weeks on end!
TSP34: MechForce Any number of players can control up to 24 giant robots with lasers, missiles, jump-jets to get you airborne to do battle in teams against each other or against the computer...*highly* addicting!
TSP33ABCD: Complete Guide to Programming the Amiga in "C" This four disk set features tutorials, sample programs and inside tips to the special programming needs of the Amiga. Four disks counts as three.
TSP32: Classic Arcade Games Defender and Missile Command--need we say more? Descender is a clone of the classic Tempest.
TSP31: DataBases Contains all flavors of databases. BBaseII is a highly Amiga-tized database, DataEasy is another powerful database. MagMan is specially designed to help you reference articles in magazines.
TSP30: Educational This includes WorldDataBase, DrawMap--which draws detailed maps of countries. WordGame, Metric Converter, Spell2--an ingenious spelling challenger. FastFacts--everything you always wanted to know about our Solar System.
TSP29ABC: King James Bible The complete text of the bible is included on this 3 disk set (counts as 3) with printing and searching capabilities.
TSP28: Bitmapped Fonts This disk contains 67 fonts for the Amiga, all under 25 points in size...a font for every occasion!
TSP27: Octa-MED This remarkable program doubles the sound capabilities of your Amiga from 4 channels of audio to 8! Almost completely identical to MED, this is a truly remarkable program.
TSP26: Directory Utilities Contains all of the best public domain and shareware file and disk utilities available for the Amiga, including UtilMaster, FileMan, M2DU, Sid and DirMaster.
TSP25: SpaceGames Contains MoonBase a very graphically detailed lunar-lander game, SpaceWar-a two player (either in person or over the modem) space battle. Nebula is a 3D world you must defend..definitely commercial quality.



Diffusion featured on RK5

TSP24: Printing Utilities This disk contains a very nice Banner maker that will use any AmigaDOS font with full-color printing. RobsLabelCreator will allow easy creating of labels for your diskettes. PrintStudio allows easy printing of text/graphic images with total control over page numbering/titling, etc.
TSP23AB: Tobias Star Trek A graphic space adventure where you're the captain of your own starship. Travel through the universe, stop the Romulans and Klingons and complete your missions. Two disks, counts as two.
TSP21: Disk Duplicators This disk contains all the best utilities to backup diskettes. Included are XCopyIII and NIB which will backup copy-protect programs. Also includes SuperDuper which is an incredibly fast AmigaDOS copier. Freecopy will *remove* copy protection from many popular commercial programs.
TSP20: Board Games Includes Checkers, Dominoes, Clue, Jeopard and Monopoly. Throw away your dice and let your Amiga take care of the details...hours and hours of family fun!
TSP19: PacMan Classics Contains Mazeman, Zonix and PacMan87--all great implementations of the origional arcade classic.
TSP18: MS-DOS Emulation Contains PCTask and IBeM, two shareware IBM-MS Dos emulators for your Amiga. Also included are utilities to allow Amiga drives to read/write 720K format MS-DOS disks--Multidos and MSH.
TSP17: Printer Drivers This disk contains over 70 popular printer drivers.
TSP16: Telecommunication This disk contains two first-class modem programs, NComm and Access. This disk is for the beginner or expert telecommunicator, featuring all the popular communication protocols, including X, Y and Z-Modem. NComm has very advanced script capabilities for performing automated log-ins, downloads and uploads.
TSP15: MED This disk contains the premier music package, MED (Musical EDitor). It will allow you to use digitized sound samples as your instruments and use them in your own songs. Its tremendous editing power makes MED more of a musical word-processor. An extremely well-done program. Many commercial software companies use this package to create soundtracks for their entertainment programs.

ToolChest Exclusive!

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Whether you're into composing, collecting, studying, or simply enjoying music, then AM/FM has lots to offer. If you want to learn more about using the Amiga as a music computer, then AM/FM is for you. Each disk contains news, reviews, previews, hints & tips, tutorials, new sounds for popular synthesizers, lots of great Amiga music, and the latest sound and music utilities! Each issue contains 2-5 Amiga songs, 2-5 MIDI songs and **4-8 Sound/Music Utility programs!**

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AM3: Roland utilities, ProPlayer (for MODS), 4 MIDI and 3 Amiga songs.
AM4: Roland Sample storage/loader utils., 4 MIDI and 4 Amiga songs.
AM5: Yamaha & Korg Editor/Storage pgms, 5 MIDI and 2 Amiga songs.
AM6: ProPlay 2, MutliRipper, Casio CZ utils. 5 MIDI and 4 Amiga songs.
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Pricing: AM series disks: $9.95 each. **Special introductory offer: Buy 4 and get the 1 free! Buy 7 and get 2 free!!** SM series disks: $7.95 each. AM & SM series disks do not count towards normal (TSP & TC) disk pricing levels.

TSP14: Plotters This disk contains several of the best mathematical plotting programs available for the Amiga. Includes AmigaPlot--a 3-dimensional mathematical function plotter (pictured), Aplot2.0, and PlotXY
TSP13: Tetris Games Contains 6 flavors of the classic game "Tetris." Some have artificial intelligence, others a variety of play-styles/skill levels/number of players.
TSP12: ClipArt This disk contains several excellent bitmapped images for use in Desktop Publishing or similar programs.
TSP10: Fractals Scenery (pictured) will create realistic fractal landscapes. Genesis allows the creation of various landscapes with user-definable levels of complexity. Also included are various Mandelbrot generators, including TMandel, Mandel-Mountains and FracGen.
TSP9: Utilities #1 IconMeister—an Icon editor with a complete set of editing/painting tools. TJFormat—a disk formatting program that will format disks that AmigaDOS wont. ChartMaster—a graphing tool that allows you to generate and save different graphs in IFF format. Graph3D lets you visualize complex data in 3-D and save the results. StructGen lets you create gadgets, text, bitmaps and window structures and the program will automagically write the "C" source code for you. LabelMaker is a very easy to use, full featured label printer. DoublePrint fascilitates printing of text files on both sides of paper.
TSP8: Clipart Black & White and colorful clipart for a variety of needs including desktop publishing/video. People, holiday related, school items, scrolls, food, monsters, fish, lobsters, symbols and lots more.

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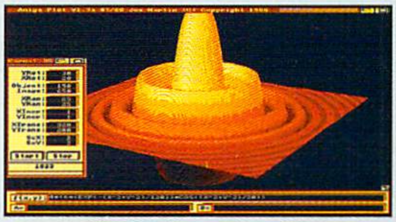
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TSP6: 3D Vector Objects #1 Lamp, mirror, bed, chair, fire hydrant, lamp post, street lamp, street sign, traffic light, cannon, cannon supplies, rose, fork, spoon, knife and plate. All objects in Sculpt format.
TSP3: Games 1 Crystal Caverns is an adventure game with randomly generated worlds--you'll never trash the same world twice! Dot2Dot is an adaptation of the classic 2-player connect-the-dot game. PizzaDeliveryMan has you running through the streets to get those pies to your customers. TinyBall is the world's smallest baseball game. Surround-Cycles is a high-speed arcade game, based on the light cycle races from the Disney movie Tron.
TSP2: Sounds Animal sounds, musical instruments and many, many more—43 sound samples in all!
TSP1: Maps of USA, Canada and Europe Hi-Res IFF brushes of all 50 US States, 10 Canadian Provinces and countries in Europe. Each map has a 3D extrusion effect with cast shadow.
TC38AB: Galaga is better than the arcade original. Geotime shows the world and where its light/dark. Restaure is an easy-to-use file un-deleter. SysInfo shows memory, boards, speed & other system info. VideoPoker will save you hundreds of $$ in a casino. Also includes sound effects & very detailed Impulse object of remote control.
TC37AB: DeluxePacMan is hotter than the arcade game with power-ups and new levels. SubStore allows you to keep tack of your magazine collection. Kwickback will give quick, reliable backups of your hard drive. Also includes 3D Tic Tac Toe, Rolodex to keep track of names/numbers and BeatStomperII--a fun and functional drum machine for your amiga. Also includes 3D object of giant robot & sound effects.
TC36AB: MachIII will give macros, screenblanker & more to your system. SID and DirMaster are great directory utilities, PrintStudio allows versatile printing of graphics and documents. Degrader gets old programs working with new machines. Amigoids is an incredible asteroids game--totally editable graphics. Plus 3D objects & sounds.
TC35AB: Checkbook Accountant will let you balance your checkbook in 2 minutes! SpaceWar is the classic redone as only the Amiga can do. VideoStore tracks your video collection. A-Gene is a family-tree program. MotherLode is akin to the classic Lode Runner. Also 3D objects of an A3000 and clipart for publishing.
TC34AB: Optimizer will permanently speedup your hard-drive or floppy disks. LCD Calc is a nice full-screen calculator. BBaseII is a useful database program. FixDisk will correct many problems with disks. BizCalc is a loan analyser. Interferon is a Tetris-type game. Nebula is a 3D space game. PicBase will allow you to track all the IFF images you have. Hate is a great Zaxxon clone.
TC32AB: Computer Coloring Book is a delightful program for children of all ages—comes with 15 pages of pictures to color again and again. Listmaker lets you make, edit, combine and print lists of words—great for spelling tests! Moresmooth! scrolls text files smoothly on the screen and allows easy printing. Pocket Billiards lets you choose from several popular pool games with realistic action. Texture allows you to create, manipulate and save (in standard IFF format) realistic fractal textured surfaces. Plague is a monster maze game. Also includes Screen Fader, Snowbench, and FlipBench.
TC31AB: Calendar Publisher is a professional-caliber calendar maker that is customizable. CrossCircuit is a 1 or 2 player action/logic game that calls for fast reflexes and thinking. APR is a much-needed printer utility. Pizza Delivery Man is a maze game where you deliver pies in your neighborhood. Multiplayer is a single program that will let you see IFF pictures/brushes or playback IFF sound samples. Also includes RAMgauge, 3-D vector objects and Hi-Res IFF brushes of maps and flags of European countries.
TC25AB: ScreenToIFF captures your screen to an IFF file. PopColors lets you change the colors of your Workbench screen. Warrior is a fun shoot'em-up/adventure game for one or two players. Kaleidoscope is a line drawing program. Blockbusters is a game where you get rid of blocks by pushing matching blocks into them. Amidemo will show-off your Amigas ability to do solid-polygon animations. Microscope lets you examine memory at any location. Also includes Hi-Res IFF brushes of all 50 states and 10 Canadian provinces, nine digitized sounds and two small disk utilities and printer utility.
TC11: DiskSalvage will fix corrupted disks and recover deleted files. IconMeister is an advanced Icon editor. AlienDuel is a fast, shoot'em-up game. Crystal Caverns is a colorful, graphic adventure game like the arcade game. Also includes an animation, sound samples, 3D dinner table objects, and Hi-Res monster clip-art.

Special Edition Toolchest

RK1: MegaBall - This disk contains the full-release version of MegaBall, complete with the level editor to create your own challenging worlds to conquer. This game is quite similar to Arkanoid and allows two players with stereo sound and 5 soundtracks! Special RK price, $14.95.
RK2: MachIII - This remarkable utility will allow you to record any mouse click or keypress and play it back as a macro at any time, inside any program. Also provides memory info/clock, alarm, screen blanker, mouse accelerator, mouse-to-menu, sunmouse and window cycling. Special RK price $19.95.
RK3: 3D Objects an amazing collection of some great 3D objects we've ever seen. Running man, spaceships, staircase, hoverboats & much more. Also texture maps to wrap around some of the objects...1.5MB of data in all! $14.95
RK4: Home Manager This program will help you keep track of your life! Complete address book, appointment scheduler, notepad, auto-dialer (requires modem), area-code utility and complete inventory of all your possessions and credit cards. Extremely useful. Requires 1 Meg. $14.95
RK5: Diffusion an Alient terrorists plants a Nuclear Time bomb and you are the only chance of saving the world! Outstanding graphics and sounds complete the mood of this futuristic race against time and devastation! $14.95



AmigaPlot featured on TSP14

The AmigaWorld Toolchest

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HELP KEY

An A600/IDE hard-drive compatibility caper, and fearless battle with the dreaded "Printer Trouble" message.

By Tim Walsh

How to Drive the A600

Q. *I recently purchased an Amiga 600 and would like to install a 2.5-inch IDE hard-disk drive in it. Mounting hardware inside the case and an IDE connector on the motherboard seem to indicate this is possible; both my Amiga dealer and Commodore Express, however, said otherwise. Is there any way to install such a drive in the A600?*

Joel Kraft
Red Bluff, CA

A. Research on your question has made it "clear" to me that there's less mystery surrounding Jimmy Hoffa's whereabouts than A600/IDE hard-drive compatibility. Neither several technicians nor an Amiga dealer could tell me with confidence that the A600 is *not* IDE compatible. Having installed a 40MB IDE hard drive supplied by Commodore in what I assumed to be a production A600, I find it odd that your A600, unlike the one I used, already contained mounts for the drive. It may be a good sign.

While the results of connecting an IDE drive to the 44-pin connector on the A600's motherboard is anyone's guess, you've already voided your warranty by opening the case, so there's no harm in experimenting a little further with the installation of the IDE drive.

Minute variations in IDE drive designs and other unknowns render the success of such an installation uncertain. Therefore, with a very hearty disclaimer attached, I'll venture what might work, based on personal experience and the fact that your A600 already has the hard-drive mounting hardware. After installing a standard 40MB IDE drive, such as a Seagate, get two more items, A 2.1 Kickstart ROM for an A600HD (from your dealer) and a copy of the A600HD hard-disk installation software. Replace the A600's ROM (found in the only socket on the motherboard) with the A600HD's chip. Run the installation software and probably, hopefully, the hard drive will come to life.

MultiStart II/Workbench 2.0 Parallel Death

Q. *Ever since I installed DKB Software's MultiStart II board with both the 1.3 and 2.0 Kickstart ROMs in my A2000, I've had problems in 2.0 mode: I can't access the parallel port. If I try to print under 2.0, I receive the dreaded "Printer Trouble" system error. Booting under 1.3 from a floppy, however, allows me to print just fine.*

Ken Kowalski
Winnipeg, Manitoba

A. I can think of several likely possibilities: a missing file or two in the 2.0 Devs directory, or a problem with the MultiStart II board. There's little chance anything's wrong with the parallel port, since it functions under 1.3.

First, on your hard disk, check the Workbench 2.0 Devs directory to make sure your using the PRINTER. DEVICE and PARALLEL.DEVICE files that came with the board. If either one of these files is missing, copy it to your hard disk from the copy of 2.0 that was supplied with MultiStart II.

If the problem persists with those files in place, procedures applicable to any circuit board are appropriate. First, the 2.0 Kickstart ROM might be defective. The ROM can be removed and a replacement chip tried on the board. If the parallel port then works under 2.04, it's obvious the chip is to blame.

If a second Kickstart ROM still doesn't revitalize the parallel port, the time tested two-Amiga diagnostic test is in order: Try the MultiStart II board in *another* A2000. If the parallel port problem remains after installing the board in a second computer, it's a sure bet the board is defective. Don't try to repair the board yourself unless you're highly skilled with a soldering gun and know the particulars of the circuitry of the 2.0 ROM section of the board; otherwise, contact the manufacturer or distributor for a replacement.

Tandy 100 to A3000

Q. *For years I used the Tandy Model 100 to create documents and simply plugged its serial cable into the A500's port and used TextPro 1.01 to read in the text. Now TextPro hangs up and Gurus under 2.04 on my A3000. How can I transfer ASCII text from my Model 100 to my A3000?*

Tom Napier
North Wales, PA

A. For those unfamiliar, the Tandy 100 was a battery-gobbling, disk-drive-less precursor to laptops that allowed slow but reliable transfer of files to other platforms through a built-in modem.

Circumventing your incompatibility problem should be a snap. If you've installed TextPro on your main hard-disk volume (typically called "Work"), boot up the A3000 in 1.3 mode by powering up the machine (cold) while holding down both mouse buttons. Select the screen option for booting 1.3 from the hard disk.

When the 1.3 Workbench screen appears, run the copy of TextPro you installed under 2.04. (If your TextPro doesn't work under 1.3, get a copy of Chris Hames' freely distributable Degrader 1.0 program. An A3000 owner's must-have, Degrader lets you turn off a multitude of options, such as Fast memory, Cache, and Burst Modes—the kinds of things that keep older programs from running on the A3000.)

Once TextPro is running, you need only run your A3000 under 1.3 long enough to connect the Model 100 to the serial port, transfer the file, and save it to disk—the same as with your A500. Now, power up in 2.04 mode, and use any 2.04-compatible word processor to read in the file as ASCII text. Follow this procedure whenever you need to transfer other files from the Model 100. ■

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DD79abcd: Amiga "C" Tutorial - This is the most comprehensive C language--*Amiga oriented*--set of tutorials available. Includes full working examples, source code and an incredible set of lessons. Included are full discussions and examples for Amiga programming. 4 disk set, counts as 3.

NEW DISKS

FD85: UChess: The strongest playing Chess program available for the Amiga period. Req. 68030+, Workbench2+, 4MB RAM. Supports AGA.
FD84: Games! Deluxe PacMan is better than the origional--20+ mazes, special "power-ups" with *oustanding* graphics. ThinkAmania is the classic game of concentration--with *beautifully* drawn HiRes images.
FD83: Arcade Series: Contains Croaker and Squamble, two great clones of the arcade games "Frogger" and "Scramble."
WB126: EdPlayer - music MOD player that looks, acts and plays like your CD player...AmigaWorld's #1 MOD utility. Plus MOD songs.
WB124: Flags of the World - Two modes: click and learn or a game to test your knowledge. Great graphics--fantastic learning tool. Has current Russia & Yugoslavia republics. Req. Workbench 2.0+ & 1MB RAM.
WB123AB: Flags of the World - same as above, but for 1.3. Req. 1MB.
WB122: System Optimizer - KCommodity ehances your system, gives memory meters, mouse/keyboard enhancements, online timers plus *many* others...too numerous to list! REorg will optimize hard and floppy-disks for a big speed increase. HDMem will allow you to use up to 2 megs of hard-drive space for virtual memory! (Req. 68020+ w/MMU) All programs require 2.0+.
WB121: ProPage3 Enhancer - This disk contains over 40 "Genies" for use with ProPage 3.0, including useful ones like Make Pie Chart and Resize Text to fit Box to name a few. Also includes structured & bitmap clipart for unique borders...a *must have* for all PPage 3 users.
WB120: Grinder - a complete graphics conversion package that supports GIF's, JPeg, Atari ST (Neochrome & Degas), PCX, Targa, TIFF, HAM-E and IFF format pictures.
DD90: Advanced Utilities - CompressDisk doubles the capacity of your hard-drive on the fly with compression!!! Also contains: disk optimizer, SCSI mount utility, Keymap editors, Enforcer, Undeleter & more. Most programs require 2.0+.
DD89: UEdit - Probably *the* most powerful text editor ever written for the Amiga. Previously commercial, now public domain. Req. 1 MB.

FUN DISKS

FD5: Tactical Games - BullRun - a Civil war battle game, Metro you play the role of a city planner. Build wisely and your system will be a success, but poor planning will lead to disaster and financial ruin. Very very habit forming.
FD6: GAMES! - This disk is chock full of games including; Checkers, Clue, Gold - A new slide the pieces puzzle, Jeopard - An enhanced version of Risk, RushHour - Surprisingly addicting, and SpaceWar - Best described as a cross between Combat-Tanks and asteroids.
FD7: Pacman - This disk contains several pacman type games including; PacMan87, MazMan and Zonix.
FD9: Moria -. This has great graphic controls, multiple spells, similar to Larn and Hack. Play time several weeks!
FD10: HackLite - A dungeon adventure game. Considered a must-have classic. This is the second release of this game on the Amiga. Great graphic interface. Play time several weeks!
FD11: Las Vegas and Card Games - Las Vegas Craps - The best Las Vegas Craps simulation every written for any computer. Contains extensive HELP features, Also Thirty-One,VideoPoker and more.
FD12A,FD12B: Star Trek, The Game - This is by far the best Star Trek game ever written for any computer. It features mouse control, good graphics, digitized sound effects and great gameplay. Counts as 2 disks. Req. 1Mb and two drives (or hd).
FD13: Board Games - contains multiplayer Monopoly, Dominoes, Paranoids, and others.
FD14: Dungeon Master Hints and Arcade Games - DM maps, spells, item location, and hints and more, also on this disk, Hball - an arkanoid/breakout type game, Trix - a Qix type clone.
FD17: Educational Games - This disk includes several games for the younger members including geography, math, science, and word games, also includes Wheel of Fortune.
FD20: Tactical Games - MechForce(3.72); A game that simulates combat between two or more giant, robot-like machines. Simple words can't begin to give you the feel of piloting a 30 - 40 foot tall, fire breathing, earth shaking colossus that obeys your every whim.
FD26:Arcade Games - Marble_slide is a commercial quality game—similar to a Lucas game named PipeDreams, excellent playability and entertainment. Mutants—a small version of the same arcade game. SuperBreakout is a Pong/Arkanoids type game.
FD27: Arcade Games - This disk is loaded with some great games. Includes, Raceorama a great racing car game with ten different courses, MiniBlast a helicopter gunship type clone, Shark in the same class as froger, and SBreakout the original breakout with more.
FD29: Shoot'em up's - WWII - you're the pilot of a WWII plane flying through enemy territory, you've just been spotted, good luck on you mission, SpKiller - try and penetrate enemy lines with this game, and Retaliator - another great game.
FD31: Games! - Air Traffic Control - a good ATC simulation, Black Jack Lab - a full featured set of card games, ChessTel - play chess with your friend in distant and remote places with this game and a modem, labyrnth - a well done text adventure game (like an infocom game), and MouseTrap - a 3d maze game.
FD32: Flight Simulator - An instrument flight simulator for a DC10.
FD33: Arcade Games - Ffreddy a Mario Brothers type of game, Gerbils a target practice game, PipeLine a German interpretation of Pipe Dreams, Tron a light cycles version, and Wetroids a wonderful version of asteroids with a hilarious twist.
FD35: Omega (v 1.3) - An outstanding dungeon and outdoors adventure game in a similar vein as hack, rouge, and moria. This version is considerably faster and better that all previous versions. Play time: weeks.
FD37A&B:Tactical Games - Empire (2.2w) This great game comes highly recommended. With a full-graphic front end.
FD38: Games - Cribbage Master - A great cribbage game and tutor, Spades - a well done card came, ChineseCheckers - A computer version of this classic, Puzz - a slide piece puzzle game and construction set.

SPECIAL PRODUCT!

QT1: THE A64 PACKAGE - A very complete Commodore 64 emulator. Supports any CPU and is fully compatable with WB1.3 & 2.0. This version includes a special adaptor that will allow you to connect your 64's 1541 disk drive to your parallel port of your Amiga for total emulation. Two disk set, counts as two. Special price $49.95 - including hardware.

FD39A&B: Star Trek, The New Generation - This is a, completely different version of Star Trek than that found on FD12. This one was created by the German author Tobias. Now with English instructions. Excellent!!! Counts as two disks. Requires 512k
FD44: Game - Mechfight is an out of this world role-playing adventure comparable to hack and moria. The setting, interplanetary colonies and space stations. In your quest to explore the world, take time out to liberate bad guys of their most valuable possessions, engage in a mortal combat or two against robots and alien life forms, pick up a new Amiga 9000. Most of all, don't forget to stay alive...
FD50: Submarine Game - Sealance, one and a half years in the making, this is an outstanding submarine tactical game. Commercial quality, highly recommended.
FD52: Classics Games - PetersQuest a well done Mario brothers type of game, Jymbc a two player missile command clone, and Vstank a tank commander game.
FD53: Great Arcade - On this disk is a wonderful implementation of the ever popular classic arcade game Defender. Also contain Air Race a WWII flying ace arcade game, and Psycoblast new creation idea game.
FD57: Arcade Games - Includes 2 truly commercial quality games. MegaBall, an Arkanoid-ish game, features 5 musical scores, multiple levels and addicting gameplay. Gravity Attack is a psychadellic trip through several different worlds—each distinctly different.
FD59: Game Potpourri - Xenon III is an almost exact clone of the commercial game of the same name...a great shootemup. Crossword will take lists of words & automatically generate word-search puzzles for any Epson compatable printer.
FD60: Games - In Nebula, race over a 3d world to destroy enemy installations. Interferon; a *great* Dr. Mario clone. Enigma; is it a game or puzzle?
FD61: Games - Solitaire; great graphics, plays two versions. Klide; an interesting piece of eye candy. Extreme Violence; 2 player kill or bekilled game. YATC; A Tetris clone with Artifical Intelligence. Genesis; create realistic 3d fractal worlds.
FD62: PomPom Gunner. An extremely smooth and well done World War II gunner simulation. Requires 1 megabyte of memory.
FD64: Games - Wizzy's Quest - a "great" 50 level game with great graphics, Cubus - a 3-dimensional Tetris type game (rotate and move in 3 dimensions). Husker Du - Colors and pattern rather than shape in this Tetris-esque game; 5 screens and 3 levels of difficulty. Requires Fat Agnus (1 Meg of Chip)
FD67: Arcade - Includes Llamatron a well-done 'Robotron' clone. Hate is a "terrific" commercial grade Zaxxon clone with multiple levels/worlds and smooth diagonal scrolling...a 10!
FD68: Potpourri - Eternal Rome is a strategic simulation of the Roman Empire including military, diplomatic, political, economic and social factors. Lord of Hosts is a strategy game for 2 players. In Moonshine, get the hootch across the state line—a great rolling, scrolling driving game!
FD69: MindGames - Had enough of shoot-em up games? Relax and let these 21 games exercise your mind instead of your wrist.
FD70: SpaceGames - Contains AmiGoids, >finally!< an Asteroids game that takes advantage of the Amiga—totally configurable with great sound and grpahics. In Cosmostruction the object of the game is for each Cosmostruction team to acquire the most points while construction energy ducts between the space station and planetoids.
FD71A&B: Star Trek: TNG Trivia Challenge - So you think you know The Next Generation, huh? Complete with fantastic sampled sounds and digitized images, this game even looks and sounds like a genuine Star Trek terminal! VERY thorough and complete! Counts as 2 disks.
FD72: Sword of the Warlock - This is a demo version of a great public domain graphic dungeon adventure game. The adventure spans three diskettes and allows two players to go adventuring. The game has a 'Bards Tale' feel to it. Three disk set, counts as 2. Requires 1 meg of RAM and 2 floppy drives--HD installable.
FD73: Arcade Series - Intruder Alert! is a MULTI-level "Berserk" clone. Features smooth gameplay, great graphics & digitized sound f/x.
FD74: Arcade Series - RingWar is an "Outer Limits" clone with vectorized graphics. MotherLode is a "Lode Runner" clone with 50 levels! In BlitzTanks, they're coming at you from all directions!! Call in air strikes and use your heavy artillery to survive!
FD75: Arcade Series - Descender is a clone of the classic arcade game "Tempest"; complete with vectorized graphics. Tanx is the classic battle of trajectories and inertia between two tanks—incredibly well done! Search is a maze game unlike any other—included is a level editor too. (Tanx requires 1 meg chip memory=Fat Agnus)
FD76: Catacomb - is a full graphic dungeon adventure game with beautiful graphics and a very slick icon/mouse driven interface.
FD77: Arcade Series - Galaga'92 is a clone of the arcade game of the same name with several gameplay enhancements--with smooooth, sharp graphics, it's better than the origional! Pharaohs Curse is a clone of the origional C64 classic. Diplomacy is a beautifully computerized version of the Avalon Hill board game--conquer or be conquered!
FD81: SuperGames - Some of *the* best games--Donkey Kong is better than the origional *with an extra level*! Frantic Freddie and TrailBlazer are both fast-pased arcade games. Mad Bomber is the classic game of "Kaboom" redone with an Amiga flare. All of these games are excellent!
FD82: Intrepid - In the Arctic ice, you control a tank on a mission to rescue hostages in this superbly crafted Amiga origional.

WORKBENCH DISKS

WB4:Telecommumnication - This disk contains several excellent pd communication programs: Access 1.42, Comm 1.34 & Handshake 2.12a.
WB5: Fonts #1- Several fonts (35) for the Amiga, also included are five PageStream fonts,and ShowFont - a font display program.
WB6: Fonts #2 - ShowFont(4.0) This program allows you to quickly and painlessly view all 256 characters in a typical font. Large AmigaDos system fonts (many up to 56pts).
WB7: Clip Art - This disk is loaded with black and white clip art. Art includes, trees, watches, tools, US and State maps, and more.
WB9: Icons - Truly a multitude of various types and kinds. Also includes IconMiester, IconLab, and others great utilities to help generate icons.
WB10: Virus Killers - The best: VirusX(4.0), Kv(2.1), and ZeroVirus III.
WB11: Business - Clerk(4.0), finally a full featured business accounting PD program for the small to medium company. Includes receivables, payables, end of month and uch more.
WB12: Disk Utilities - This great disk is loaded with wonderful utilities for everything including making disk labels, disk cataloging, disk optimizing, disk and file recovery archive and organizing, and all sorts of file manipulation. A must have!
WB13: Printer Drivers and Generator - over 70 different drivers (including HP LaserJet 3&4!), also includes a printer-driver generator.
WB15: Business - This disk contains a spreadsheet, a database, a project/time management program and financial analysis (stocks).
WB16: Business - This disk contains an inventory manager, a loan analysis program, a great calendar/scheduler, a rolodex program, and pennywise a good "Cash Book" accounting for home or office.
WB18: Word/Text Processors - This disk contains the best editors. Includes,TextPlus (v2.2e) a full featured word processor, Dme(v1.35) a great programmers editor with strong macro features,TexED(v2.8) an enhanced Emacs type editor, and a spell checker.
WB22: Fonts #3 - Several more great fonts. These, like the other font disks work great with Dpaint and WYSIWYG word processors.
WB23: Graphics and Plotting - Plot (20b) a 3-D mathematical function plotter. Can plot any user defined function, BezSurf2 - produce awesome pictures of objects one could turn on a lathe. Can also map iff image files onto any surface that it can draw. Now compatible with most 3D packages, and VScreen - makes a virtual screen anywhere, great for DTP!
WB25:Educational - On this disk are two programs that can generate maps of differing types, World Data Base uses the CIA's data base to generate detailed maps of any entered user global coordinates. Also Paradox a great demonstration of Albert Einstein General Theory of Relativity.
WB26: Disk Utilities #2 - MrBackup, KwickBackup - two well done utilities to do harddisk and floppy disk backups, FileMast - a binary file editor, Labelprinter - Disk label printer with very powerful features.

WB118: Amiga Beginner - You asked for it! This disk contains a complete tutorial for the beginner on using the Amiga. Starts you off at the power-switch and takes you through to the CLI/Shell and all points in between. *Bonus!* Also included are 16-color icons to replace *every* icon in your 2.0+ Workbench.

WB27: Nagel - 26 Patrick Nagel pictures of beautiful women.
WB29: Graphics and Sound - This disk has several different Mandelbrot type programs producing stunning graphics. Includes, MandelMountains - a realistic terrain generator, Fracgen - generate recursive fractals from user input, Mandelbrot and Tmandel - two fast mandelbrot generators, also Mostra - the best IFF display program to date. Sound - a great IFF sound player, will play anything.
WB33:Circuit Board Design - several terrific routines for the electronic enthusiast, Including PCBtool - a circuit board design tool, LogicLab - circuit logic tester, and Mcad (1.26) a well done new release of this PD CAD program, now comes with predrawn common circuit components for insertion into schematics.
WB34: Utilities - Several well done utilities, some will require moderate knowledge of a CLI or Shell for setup, Chatter Box - this one will play any user defined sound after any event (ie. disk insert, mouse click, disk removal...), , Artm - The Amiga real time monitor, gives you full control of the Amiga OS, very powerful program, Helper - help program to make learning the CLI easier, and more!
WB35: 3D Graphics - This disk contains several neat programs to use with your 3d modeling/raytracing programs 3dFonts - Full vector font set for use with 3d programs, FontMaker - make 3d fonts from any system font, Make3DShape - create 3d shapes from any image, DumptoIFF - create 3d animations preserves pallet, and World3d - a demo program of a front end for use with DKBRender.
WB36: Graphics - On this disk are several programs to create stunning graphical images including, MPath - creates swirling galaxy images, Roses - produce an unlimited number of variations of images that a symmetrically

similar to a rose, SimGen - display those spectacular images as part of your workbenck screen, and RayShade - a very good raytracing program, create your own beautiful 3d graphic models with this one!
WB37: Educational - Educational games and puzzles that cover math, geography, spelling, and books. Ages 6 - 15
WB38: Plotting and Graphics - Plotxy is a powerful full featured plotting package. Used by many colleges and universities. Highly recommended. Plans - a incredibly well done Computer Aided Drafting program, very full featured. Tesselator - a program that helps generates fantastic looking, recursive M.C. Ecsher type pictures.
WB40: Music - "CD on a disk", 90 minutes of modern music on this well presented collection. Requires 2 drives or HD.
WB41: Music - MED an incredibly well done, full featured music editor. Create your own stunning music directly on your the Amiga. Similar to SoundTracker but better. Very powerful easy to use program. Version 3.20, which is compatible with WB2+.
WB43: Business - This disk contains AnalytiCalc - probably the most powerful spreadsheet program on the Amiga. A full featured spreadsheet with many features expected in a commercial package. Req. 1.2 MB
WB46: Clip Art - HighRes clip art with the following motifs - embellishments (borders, dodads ,...), people, and transportation.
WB47: Clip Art - HighRes clip art with the following motifs - hair, drafting, summer, animals and macfood.
WB48: Clip Art - HighRes clip art with the following motifs - Holidays, music, medical, and misc.

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WB49ABC:Animation Sampler - On this three disk sampler set (counts as two disks) are some of the best animations that have been created over the last three years. Several examples of "Movie" type animations some with spectacular raytraced reality (coolroby, watch, spigot and egg). Also several european style or "Demo" animation with incredible graphics and outstanding electronic music (akrilight, copersine, doc, dps2010, impact, and logocemo). These truly show off the Amiga!
WB50: Animation - Seven of the best european style animations or "Demos", including - scientific 451, subway (a U.S. entrant, also our favorite), sunride, thrstdemo, tnight, waves, and woow.
WB53: Graphics - Raytracing programs generate absolutely stunning realistic looking planes, rockets, buildings..., and surreal images. C-Light is the most powerful EASY-TO-USE of it's kind we have seen to date. This is easily better, and more full featured, than similar commercial programs costing in the hundreds of dollars. Also, sMovie - a full featured video text titler similar to ProVideo, Broadcast Titler. Great video scrolling, wipes, special effects, and more...
WB54: Printing - This disk contains several routines to help with the chore of printing. Includes Gothic - Finally a Banner printer for the PD! PrintStudio -a well implemented all-purpose printer-utility with a very comfortable graphic interface and many advanced features, Lila - with ease, print ASCII files to a PostScript printer, and many more.
WB55: Application - XCopyIII - a full featured disk copier, make backups of copy protected disks. RoadRoute - find the quickest route from one city to another, highway description included. Diary - a diary program like "Dougy Howard M.D", Cal - a calendar program, Magman - a database tailored to maintain records on articles and publications.
WB57: Animation - This disk has several "Demo" style animations, Including, Blitter, Lolly, Sun5, vertigo, vortex, and xenmorph.
WB62: Midi Utilities - Several useful midi utilities including, programs to transfer to and from several music programs to midi, a midi sysex handler, a midi recorder with timebase, display midi info, file sequence player, and a few scores.
WB63: Disk Utilities #3 - Several highly recommended programs to aid in removing duplicate files from your hard drive, performing file backups, Binary editing, fast formatting, file recovery, disk track recovery, and forced DISK VALIDATION of corrupt disks.
WB66: Icons #2- Lot's of neat icons. Also, several wonderful programs that to let you create your own icons, modify and manipulate icons and info structures.

DD83: IBM - Not one, but *TWO* IBM emulators that will allow the running of MS-DOS software *with* Amiga programs!!! Comes complete with programs to turn your Amiga floppy drives into 720K IBM compatable drives.

WB68:Music Utilities - several good utilities for the Amiga music enthusiast. Includes, Noisetracker - a great music creation program, Sonix2MOD - converts sonix to .mod files which then can be used by noisetracker, soundtraker, and MED, SpeakerSim - a speaker design tool demo, Wondersound is an additive harmonic instrument design tool with a separate envelope design window and 16 relative harmonic strength and phase angle controls.
WB69: Music - This disk has over 90 minutes of classical and modern electronic music for you Amiga.
WB70: Desk Top Pub - Atcp - transfer Macintosh screen fonts, Mac or IBM format .AFM metric files, to Amiga screen fonts and PPage .metric files. With this program, open the door to the libraries of Adobe and PostScript fonts! Calendar - month templates in PageStream form. Post - a full featured postscript file display and print utility.
WB75: Music - over 100 instruments files (.inst) and sample sound files (.ss) for your music programs.
WB76: Applications - This disk contains Stichery - a often requested knitting design program, Lotto - a rather complete lottery tracking and prediction utility, SSS - this screen capture program can grab almost any screen including games, Today - a personal calender, Tarot - fortune teller, and Grammar - grammar checker.
WB79: Home & Business Accounting - Includes Ckbacct - the most complete checkbook accounting program going, LCDCalc - this well done calculator has a very large display and operates from the keyboard or mouse, Mileage master - monitor your automobile mileage with this mileage log, Grammar - a grammar checker, and Worldtime - find out what time it is in up to 50 global cities.
WB81: Great Applications - DataEasy a very easy to use, database program. Don't let the ease of use fool you, this is a very full featured database program including full printer control for address labels and mail merge applications. Also includes, TypeTut a good typing tutor, RLC a full featured label printer, Banner, a multi-font banner maker, and Budget a home accounting in a program. Highly recommended.

WB82: Animations - Four full length, well done "movie" style animations. Including, Coyote, JugglerII, GhostPool, & Mechanix. 2 disks, counts as 1.
WB83: Computer Art - this disk has some of the best Amiga generated computer art that we have collected in the past 5 years.
WB88ABC: The Complete Bible - A three disk set, with the entire text of the New Testament and Old Testament-King James version. A great utility. Three disk set, counts as three.
WB90: Rippers, Strippers and Beats - For the Amiga music enthusiast, this disk contains many programs designed strip music from your favorite games and programs. Also contains Drums, a very nice drum machine. This disk requires some knowledge of the CLI.
WB93: Workbench 1.3 Extras #2 This disk contains the utilities that Commodore should have shipped with the Amiga; VirusX4.0, Snap, FixDisk (recover corrupt/deleted files), Disk Optimizer (floppy & hard), MachIII (screen blanker, hotkey, mouse accel., macro, clock utility), GOMF (a guru buster)and PrintStudio.
WB95: Checkbook Accountant 2.1 - This is definitely commercial grade; we've seen many checkbook programs and this is absolutely the best. Full budgeting, transaction recording and report generation.
WB96: Dupers - Contains XcopyIII & Nib which will backup copy-protected programs. FreeCopy removes copy protection from several programs, and SuperDuper will crank-out fast AmigaDOS copies.
WB98: Business - Includes BBaseII a nice, powerful database; BizCalc—a personal or mortgage loan calculator with amortization capabilities, Loop—a flowchart maker, Formmaker - design professional forms on your Epson LQ-2500 compatible printer.
WB99: Lifestyles - Includes AGene—family tree program that tracks up to 600 people/marriages/etc. Landscape is a CAD program to create gardens/landscapes. Loom simulates an 8 harness loom; experiment with pattern design in an instant feedback environment.
WB101: Chemesthetics - is a program that displays molecules as a calotte model. This kind of display contains a certain esthetic attitude, even poisonous molecules like nicotine and dioxine look quite nice.
WB102: Telecommunications - Contains the programs NComm 2.0 and VT100-29B. Zmodem protocols, XPR protocol support, full VT100 emulation. NComm's script language is so powerful it comes with a script file that creates a full-featured BBS system.
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DEV DISKS

DD45: AREXX Programs - This disk contains several useful arexx programs and examples, PopCLI4 - The latest of a must have utility.
DD47: Pascal - This disk contains everything needed to program in Pascal. Includes, A68k (1.2) 68000 assembler, Blink linking software and PCQ (1.0) a modest Pascal sub-set compiler.
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DD50: ARexx #2 - a must have set of tutorials on ARexx and several useful examples and utilities for ARexx development.
DD51: Circuit Analysis - Aspice (2.3) A full featured program for electric circuit analysis.
DD52: Scientific - Includes Elements - an incredibly well done periodic table program with source, Scientific plotting - over 600k of Lattice C source routines that can be included in your own programs.
DD54: Compression - This disk is loaded with all of the best file compression programs and aids for the Amiga. Many of the programs can be used by the new user. Includes Arc, Lharc, Lhwarp, Pkax, PowerPacker a must have by all, Zip, Warp, and Zoo. Also IFFcrunch an excellent compression for IFF files.

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Send in your animations to:

Tim Walsh
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Requirements

Please keep all entries to 3 minutes or less in length. Animations, their soundtracks and accompanying music *must* be your own work. Since every animation we receive is potentially cablecast-bound, we need first-generation 3/4" or Beta videotape format. As with earlier contests, please include a VHS or S-VHS tape for review purposes. Submissions must include details on the hardware and software used to create them. Also include enough material on disk as proof of their Amiga origins.

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Please include name, address and phone number. The deadline is June 15, 1993.
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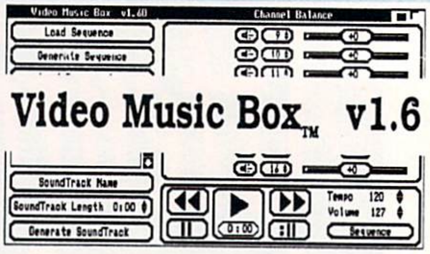
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NOTE: Last issue an incorrect number for The Blue Ribbon Softworks was printed *in their ad* on page 59. The number 404/315-2012 is incorrect. The correct number is: **404/315-0212.**

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THE LAST WORD

Kudos, complaints, comments, concerns, and contributions from our readers.

SOLID GOLD SUPPORT

I've been an avid Amiga user for years: I bought a 1000 in '86, a 2000 in '91, and a 4000 last month. Although I had no problems with the first two machines, the 4000 gave me trouble within the first week. After an hour of normal use it would crash miserably—likely a heat problem. Instead of sending it back to the dealer for replacement (from Florida to California), I called Commodore through the Express Gold warranty that came with the system. The next day, at 9:30 a.m., a brand-new A4000 arrived on my doorstep with a prepaid FedEx return form for the problem system. All I had to do was take the new one out of the box, put the defective one in, and call Federal Express to come pick it up. My hat is off to Commodore for their incredible support; that beats any PC clone warranty I've ever seen!

William R. Love
Fort Walton Beach, Florida

THE *AMIGAWORLD* WEASEL?

Two things you could do to improve *AW* for its readers are 1) get a mascot for the magazine, maybe a cute cartoon character, and 2) review retail outlets once in a while. Retailers can make buying and owning an Amiga a pleasure…or a nightmare. Too many of them act like greedy weasels.

George Purdy
Richmond, Texas

Oh well. We were considering using a weasel as our mascot, but now it seems that it might project the wrong image.—Eds.

LET'S BE FRIENDS

The SFVAUG (San Fernando Valley Amiga User's Group) letter in your December '92 issue was more than a little disappointing. It has been my privilege to be a member of the Amiga Video Graphics Guild in Los Angeles for several years, and I am pleased with the excellent work of its leaders. I disagree with the SFVAUG letter's criticisms. The guild's leaders put a lot of effort into reaching out to Amiga users in the U.S. and around the planet. They have a vision about being part of the larger Amiga world. SFVAUG's negative letter was unjustified. Come on, SFVAUG, lighten up—we've got more going for us than we have dividing us. Let's focus on that.

Paul Weiss
Santa Barbara, California

Try booting up a program that doesn't work, and see how fast ***your*** *knuckles turn white…*

GUESSING GAMES

Try booting up a program that doesn't work, and see how fast *your* knuckles turn white—particularly when it's a nifty new game that's been highly recommended (so highly that you ordered it from a mail order company and ignored the *no-return clause* in fine print). This scenario is all-too-likely for anyone who's upgraded to the new Workbench 2.04. Most applications work fine, but games…anyone's guess.

Software distributors often a) don't guarantee compatibility, and b) don't accept returns. And they are frequently unable to tell you what works on 2.04 and what doesn't.

Why can't mail order advertisers give compatibility information in their ads? A simple word or even a well-placed asterisk might ease the minds of many apprehensive would-be mail order software buyers.

Tom Knapp
Lancaster, Pennsylvania

CREDIT WHERE IT'S DUE

The ten or fifteen seconds *Computer Chronicles* gave to the A1200 (shown running lackluster graphics) seemed to me deliberately misleading. I get the feeling the show has become an infomercial for Apple and IBM. Perhaps a few thousand *AW* readers should write PBS and complain (hint, hint).

Many shows use the Amiga for graphics, including the other PBS shows *Where in the World Is Carmen Sandiego* and *Ghost Writer.* Too bad they don't credit the Amiga; it might do wonders for sales.

Richard L. Smith
Tampa, Florida

AMAZED AND FRUSTRATED

As a chemist, I work daily with computers of several types, and several instruments interfaced by computers. I cannot help but think of how the Amiga with its power, speed, and graphics capabilities could run circles around the VAX 4000s, Macs, and IBM PCs in our labs. There are hundreds of programs available for the IBM and Mac that make my job as a scientist much easier: Why must I be forced to think of IBM or Mac emulation on my Amiga as a way to enjoy these programs?

In all the years I have read *AW*, I can only remember two articles on the Amiga's use in the scientific community. The Amiga must break the video game image it has acquired to contend with UNIX, VAX, IBM, or Apple.

Augustus W. Fountain III
Tallahassee, Florida

Express your opinion! Write The Last Word, ***AmigaWorld*** *Editorial, 80 Elm St., Peterborough, NH 03458.* ■

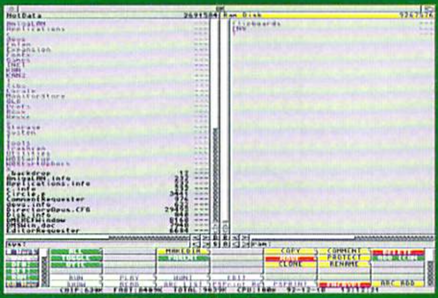
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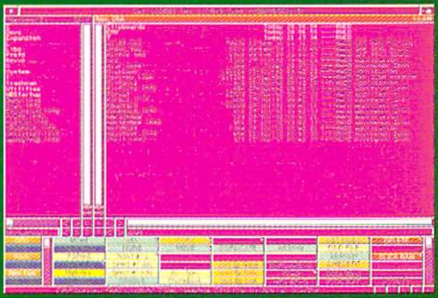
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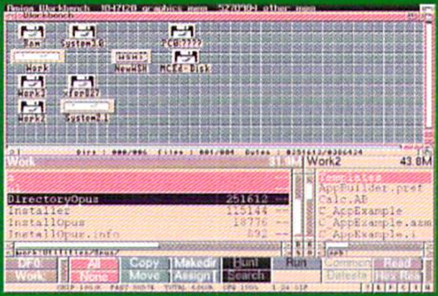
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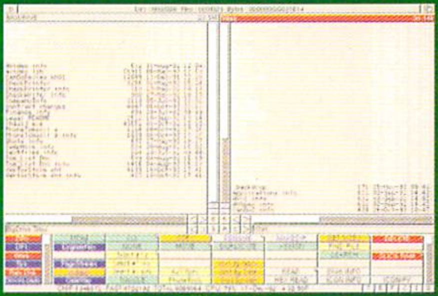

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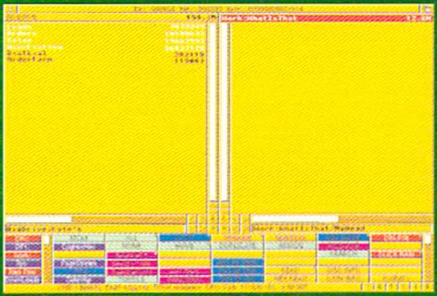

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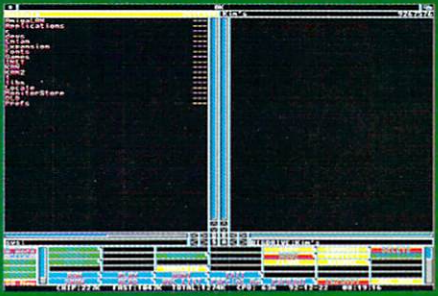

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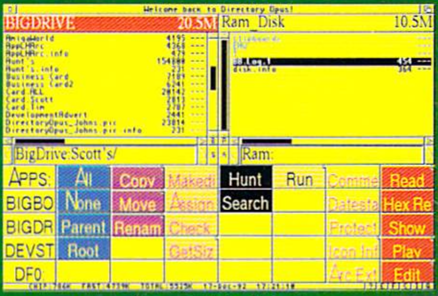

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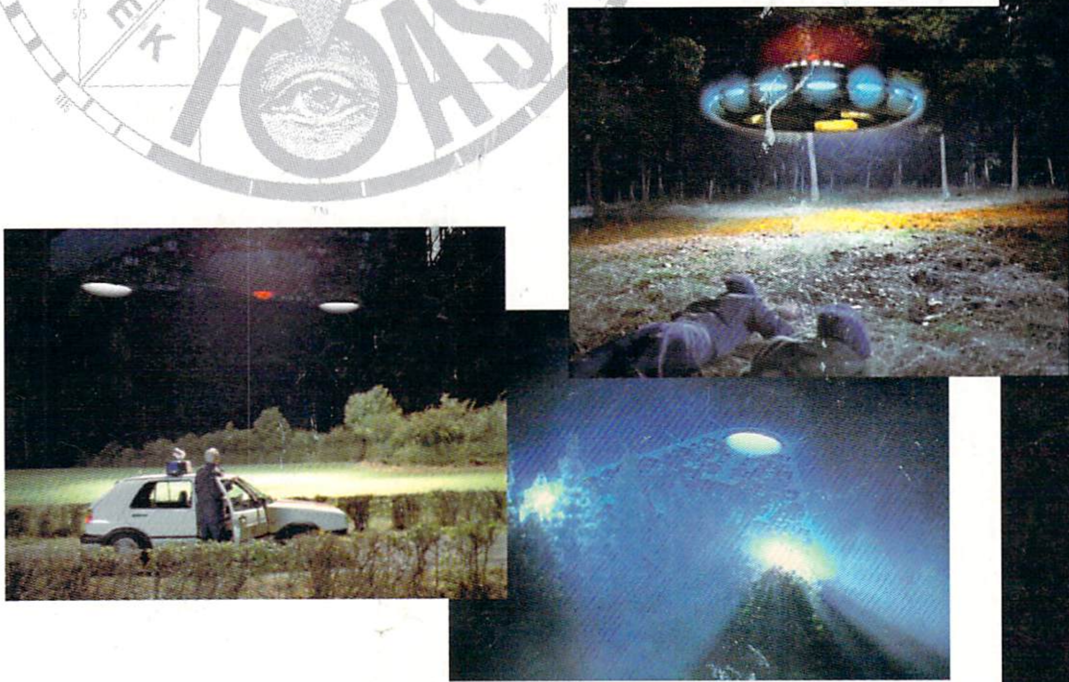
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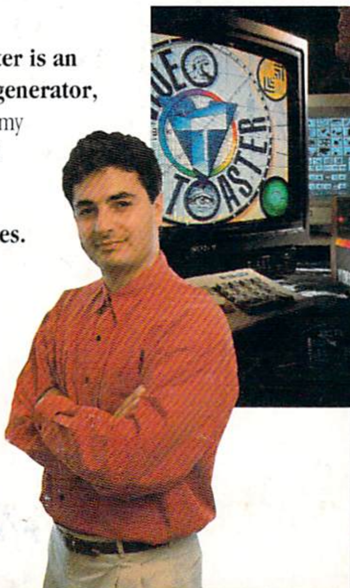


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